

U. S. Circuit Court. District of New Jersey
American Graphophone Company) In Equity on
versus) Patent 341,287
United States Phonograph Co.) No. 4005
and George E. Tewksberry)

PARTIAL RECORD , Vol. 2

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UNITED STATES CIRCUIT COURT,
DISTRICT OF NEW JERSEY.

----- X
: AMERICAN GRAPHOPHONE COMPANY,
:

vs.

: IN EQUITY ON PATENT
: 34,287.

UNITED STATES PHONOGRAPH COMPANY,
et al.
----- X

New York City, September 22nd, 1898.

Deposition of ROBERT L. THOMAS before John R. Taylor, Esq.,

Notary Public and Special Examiner.

UNITED STATES CIRCUIT COURT,
DISTRICT OF NEW JERSEY.

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AMERICAN GRAPHOPHONE COMPANY,	:	
	:	
vs.	:	IN EQUITY ON PATENT
	:	34,287.
UNITED STATES PHONOGRAPH COMPANY,	:	
et al.	:	
-----	x	

Testimony taken on behalf of defendant United States Phonograph Company, under and pursuant to the provisions and the rules of practice and Section 863 of the Revised statutes of the United States, comprising depositions of witnesses residing in the State of New Jersey and now out of the judicial district aforesaid.

Taken pursuant to notice on Thursday, the 22nd day of September, 1893, at 12 o'clock M., at No. 31 Nassau Street, Borough of Manhattan, City of New York, before JOHN R. TAYLOR, ESQ., Notary Public and special examiner by consent.

Samuel O. Edmonds, Esq., Counsel for Complainant.

Howard W. Hayes, Esq., Counsel for Defendant.

R O B E R T L. T H O M A E, a witness called on behalf of defendant, being duly sworn, in answer to interrogatories propounded to him by Mr. Hayes, deposes and says as follows:

- Q. Mr. Thomae, you reside in Fanwood, in the State of New Jersey? A. No, I do not; I reside pretty near there, but am really out of that county altogether.
- Q. Where is your residence? A. My residence is North Plainfield, Township of North Plainfield.
- Q. You are now in the State of New York, having lately come out of the District of New Jersey? A. Yes.
- Q. You are employed in New York City? A. Yes.
- Q. Were you ever in the employ of the North American Phonograph Company? A. Yes.
- Q. When did you first go into its employment? A. Februry 1, 1889.
- Q. How soon was that after its organization, as near as you can remember? A. About five months.
- Q. How long did you remain in its employ? A. I think until the first of October, 1894, after it had passed into the

hands of the Receiver.

Q. In what capacity were you employed by the Company? A.

From February 1, 1889, until September, 1892, I had charge of all orders and correspondence, general correspondence.

Q. And after that, what position did you hold? A. After that time, between September, 1892, and May, 1893, I was General Agent, or in other words, Superintendent of agencies; travelled about the country and appointed agents and looked after their affairs; audited their books, etc.

Q. And you remained in that position until the Company failed? A. No, until about April, 1893. I was made the Western Manager of all their business, West of Pittsburgh.

Q. And did you hold that position until the Company's failure? A. Yes.

Q. Did your position in the Company, during all the time you were with it, enable you to be familiar with its affairs? A. Yes.

Q. And did it enable you to be familiar with the phonograph

business generally throughout the United States? A. Yes.

Q. And were you familiar with the operations and what were going on at Edison's Phonograph Works? A. Yes, I think I was about as familiar as anyone in the Company could be.

Q. The North American Phonograph Company was the only Company at that time putting out phonographs, was it not?

A. Yes; all phonographs put out were purchased of or through the North American Phonograph Company.

Q. And where were these phonographs manufactured? A. At the Edison Phonograph Works.

Q. In Orange? A. In Orange, N. J.

Q. How early did you know of effort being made to make what are known as duplicate records? A. From the time I commenced; from within a few weeks after I went with the Company.

Q. And what was done then in regard to making these duplicates? A. Edison was experimenting with an electroplating or molding process.

Q. What was the general outline of that plan? A. I believe the original record was taken and placed within a mold and that the mold was afterwards electroplated.

Just what the materials were that formed the mold, I do not know; I think that was a secret process.

Q. And from this electroplate were the duplicates made?

A. Yes; they were put into this mold either in a liquid form, or they were put in there in their hard state and then expanded by heat so as to make the impressions.

Q. From what special source did you get your knowledge of this work being done by Mr. Edison? A. From Mr. Lipman, Mr. Thomas R. Lombard; also from Mr. Batchelor; I have often heard him refer to it; from Edison himself, and generally from the Superintendents and employes in the factory.

Q. Were any bills rendered by Mr. Edison to the North American Phonograph Company for work of this kind? A. Yes I recollect one bill that amounted to somewhere in the neighborhood of \$42,000.

Q. What was the next method of making duplicates that you knew about? A. The next method was a simple transmission of record to record through an ordinary phonograph.

Q. By means of just the sound? A. They just took an ordinary phonograph and used a spiral arrangement which came

(witness draws a sketch)
from this speaker A, and there was another phonograph placed beside it, speaker B; then they just connected these two with a flexible tube. At Y was placed a blank cylinder and at X a record; it simply reproduced the record on X and made a record on Y.

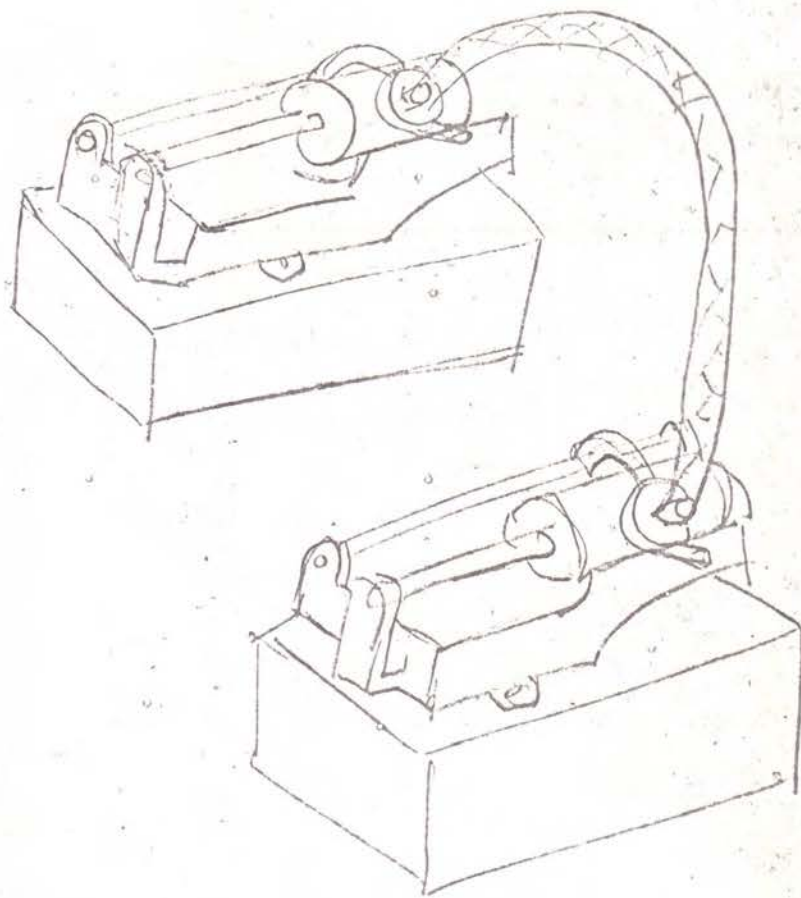
Q. You have just made a rough sketch illustrating your answer to this question; please sign your name to that.

Sketch made by witness offered in evidence in connection with his testimony.

Q. About what time was this method tried? A. Sometime in 1889.

Q. Was it successful? A. No, not very successful; it worked, but the result was not all that it should be.

Q. Was the electrotyping plan successful? A. Not that I know of, commercially; it was very successful as far as the result obtained; because I have heard record electrotyped that one could not possibly distinguish from the original, but my understanding of it was that this electrototype record cost so much that as a commercial project, it was not worth anything at that time. I never did anything with it at any rate.



Two regular Phonographs
joined by Flexible tube
thus making Duplicates

Q. What plan was finally pursued by the works of the North American Phonograph Company for making duplicates?

A. The North American Phonograph Company so far as I know, never made any duplicate records, but they sent out a circular somewhere back in 1891, when they had an office in the Edison Building, and that circular called attention to the fact that the process of duplicating records was perfected, and that if the sub-companies or makers of original records would send in their samples or their masters, the North American Phonograph Company would make (which they did not do, but caused them to be made at the works) duplicates of those records. I had a copy of that circular, but have hunted high and low for it and cannot find it. I think it was one of those mimeograph circulars in the form of a letter and was signed by Mr. Thomas R. Lombard. I am also quite sure that that was either late in 1891 or early in 1892. One correction I want to make right here is that our office in the Edison Building was in 1892, not in 1891; I know that they were duplicating then, but I think that circular preceded our moving to that office.

Q. What was this method of duplicating that you have just referred to? A. That was very similar to the method of duplication I just drew for you, but instead of having two phonographs, they had one phonograph made with two cylinders, as near as I recollect; they were set something in this fashion; of course this does not show the exact method of setting them, but the idea is about the same: (witness draws a sketch)

A was a recorder and B was a reproducer; now I don't know whether these cylinders lay vertically or horizontally or at an angle, but the general idea is here. The cylinder B contained a record, and the cylinder A, a blank cylinder; the sound was transmitted by a reproducer C to a diaphragm which we will call D, and from that diaphragm to a recorder on the opposite side of C, either from the same diaphragm or from a diaphragm at a very short distance from it connected by a set or flexible tube as I have illustrated in figure marked 2.

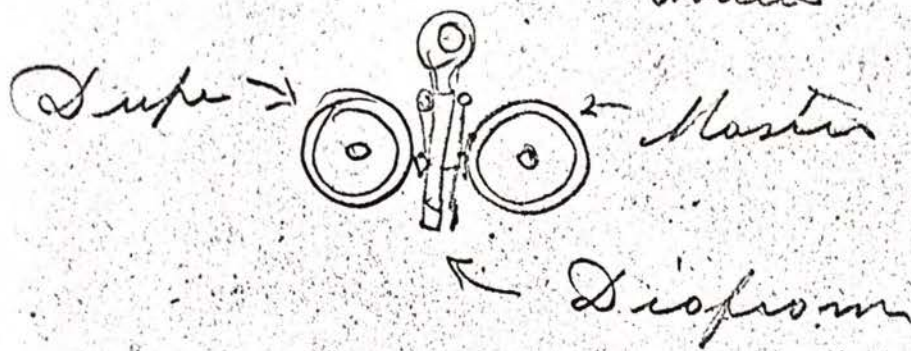
Q. Do I understand that both these methods were in use; the two methods being, one in which the recording and repro-

ducing points were on the opposite sides of the same diaphragm, and the other method where the two diaphragms were not touching each other but were connected by a tube? A. Yes; both of those methods were in use; I do not know that Edison's Works used both, or which they did use, because the duplicating machines were kept very much in the shade; you know no one was ever shown the machines themselves, simply the results from them, but we were told how they worked; that it was a mechanical duplicate. And as there was only one or two possible ways in which this could be done, from the very first I might say, I assumed that that was the way they were made. There could not be any other way, except a later method of connecting the reproducing ball and the recording stylus together on a weight arrangement or balance arrangement without the use of a diaphragm at all.

Q. Please sign your name to this sketch which you have just made.

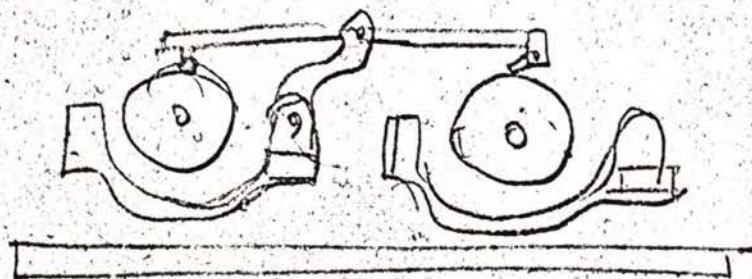
Sketch No. 2 made by witness offered in evidence in connection with his testimony.

Two regular Piano
Bodies



Two regular Piano
Bodies

Leaver with Ball on and



Q. Where did you get your information in regard to this method of duplicating pursued by the Edison Works?

A. That would be pretty difficult to say.

Q. Was it generally understood? A. Yes, it was generally understood in the office.

Q. But you cannot say? A. I cannot say definitely who told me exactly; it was probably Walter Miller.

Q. Was Walter Miller then employed by the Edison Phonograph Works? A. Yes, or by the Edison Laboratory.

Q. After you left the employ of the North American Phonograph Company or its Receiver, on October 1, 1894, what business did you engage in? A. Kinetoscopes and phonographs.

Q. Whereabouts did you carry on the phonograph business? A. Here and in Chicago.

Q. You mean in New York and Chicago? A. Yes.

Q. And how long did you remain in that business? A. I think until sometime in 1895.

Q. When you were Western Manager for the North American Phonograph Company, did you know a Mr. Douglass who was

engaged in the Phonograph business? A. Yes.

Q. What was his full name, do you remember? A. Leon F. Douglas^s.

Q. Did you also know Edward H. Amet? A. Not very well at that time.

Q. Did you know anything about the business of Douglas and Amet? A. Something, yes.

Q. Douglas was at that time working with Amet on two things; one was a spring motor for the phonograph, and I think Douglas was the man who was responsible for the spring motor; while he got up rather a crude affair, it was an incentive for other builders. Then he was also working with Amet on a duplicating machine, a mechanical duplicating machine, and from what I heard of it at the time and what I know of it now, it is about the same as the machine I just described, using no diaphragm.

Q. That is, in this machine the original and the blank are put on parallel ~~mantels~~ ^{mandrels} and the recording point follows the original record as it revolves? A. The reproducing point follows as it revolves and a recording point is rigidly attached to the reproducing point and that

recording point puts the copy of the original record on the blank, yes.

Q. That is a general rough description of the method?

A. Yes, that is about right.

Q. Do you know how early Amet or Douglas had made duplicates by this mechanical means? A. I am not sure, but I think in the latter part of 1893.

Q. Your information in regard to that came from them, what they said, or from what you saw? A. It came from both what Douglas said and from what I have seen in the way of the records they produced. I knew them to be duplicates, I knew that no other method was available but a mechanical method, and the very fact that they have always used a mechanical method has been sufficient proof to me that they never had any other.

Q. Can you place accurately how early they succeeded in making these duplicates, or do you only state it approximately? A. Approximately, the early part or the middle of 1893; let me see, do you mean the Amet people?

Well, Douglas left the employ of the Chicago Phonograph

Company at the termination of the World's Fair, and immediately thereafter I sold him a lot of phonographs to set up in business for himself, and it was within a few months after that that he was making duplicates.

Q. The World's Fair terminated when? A. It terminated on the 30th of October, 1893. Within a few months after the World's Fair was over he was in business for himself and was making duplicates.

Q. This was Douglas? A. Yes; another thing in regard to Douglas, if I am not very greatly mistaken, he had already perfected or partially perfected a system for mechanical duplicating in the early part of 1893 before the World's Fair opened and had gotten out some kind of a patent on it.

Q. How about Amet; do you know when he began business?

A. No; I ^{do not} recollect exactly when Amet became connected with Douglas.

Q. When you were in the phonograph business in New York, did you have knowledge of the United States Phonograph Company, one of the defendants in this suit? A. Well,

very little.

Q. When did you get to know anything about the business of that Company? A. Well, wait a minute on that question; I knew the officers or the principal officers - Ott and Tewksbury - when they were connected with the Kansas Phonograph Company and they afterwards, together with Victor Emerson and possibly some of the old members of the New Jersey Phonograph Company, formed the United States Phonograph Company.

Q. Well, when did you begin to know anything about their business? A. I bought records from them during the Fall of 1893, and the Spring of 1894.

Q. You mean the Fall of 1894 and Spring of 1895, don't you? A. No, I don't think so; I think it was as early as that. I bought records from them before I left the North American Phonograph Company and that was in the Spring of 1894.

Q. Well, after you went into business for yourself, did you purchase records from them? A. I think a few.

Q. Do you know whether they had a large or small business

at the time the North American Phonograph Company

failed? A. Why, I understood they were doing quite a large business, especially in records.

Q. Did you know whether they made and sold duplicate records? A. No, I did not know at that time.

Q. When, if at any time, did you learn that they were selling duplicate records? A. I think in about 1895, possibly. Yes, it could not have been before 1895, it was about the early part of 1895.

Q. And was not the knowledge that they were selling duplicate records generally known throughout the phonograph trade? A. At that time, yes.

Q. At that time it was known? A. Yes, in 1895.

Q. And was it known whether the duplicates were made by mechanical means or otherwise? A. No, I do not think it was, although I think it was generally assumed that they were mechanical duplicates.

Q. Their machines were not open for inspection? A. No.

DIRECT EXAMINATION CLOSED.

The right to enter objection to the foregoing deposition having been reserved, Counsel for complainant now enters timely objection to each and every question and answer in said deposition, on the ground that same is manifestly incompetent and in addition, largely hearsay. Without waiving his objections, complainant's counsel proceeds to cross-examine the witness.

CROSS-EXAMINATION:

Q. You have said that certain of the early duplicating machines were "kept in the shade", why was this? A. Well, I think chiefly because the people generally engaged in the phonograph exhibition trade were not any too scrupulous about stealing ideas and working them out for their own uses. I refer chiefly to the exhibitors and men of that class; what we call the fakir class.

Q. When you say that the machines were kept in the shade, I

presume you mean that they were operated privately, not in open public where they might be seen by every one?

A. Yes, that is it, operated privately at the factory; in fact I don't know of any duplicating machines that have ever been operated otherwise.

Q. When did you first see in operation a machine for duplicate phonograph records? A. Well, by the connecting tube process as early as 1889.

Q. That was the mechanism to which you have heretofore referred and sketched? A. Yes, the first sketch.

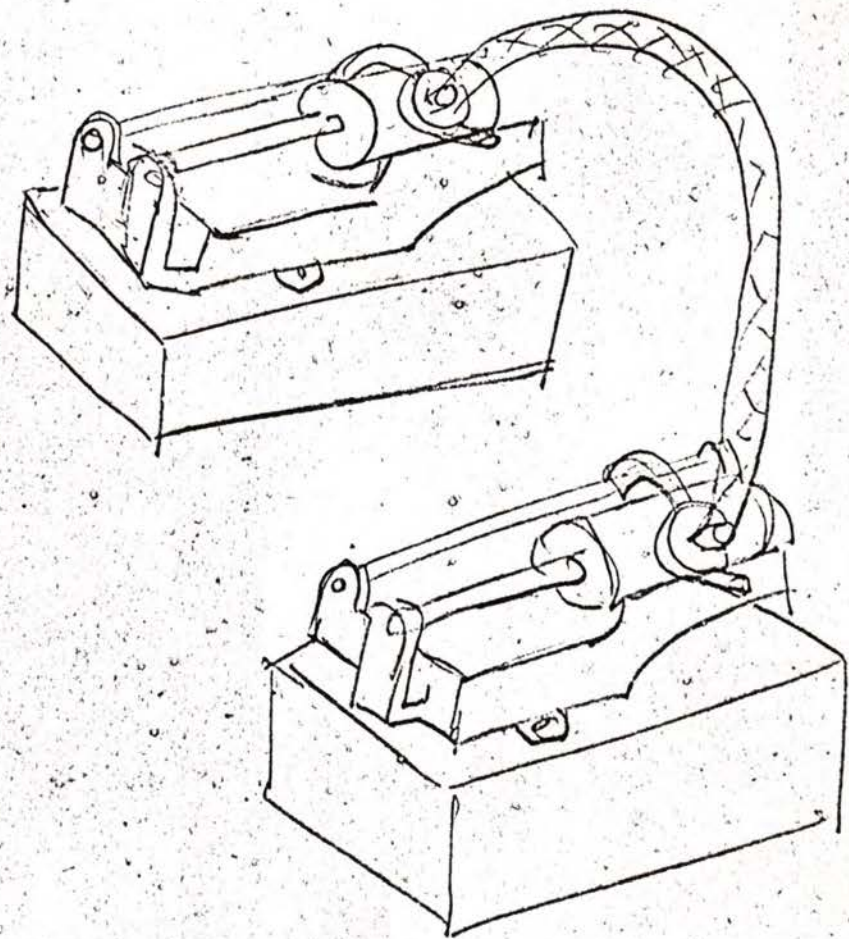
Q. When next? A. In 1893; no, wait a minute, I think it was late in 1893, or early in 1894, in Chicago.

Q. And what machine was that? A. I cannot recollect; I think it was brought in by some would-be record manufacturer.

Q. What was the occasion, did he want to interest you in it? A. He wanted to interest us in the machine?

Q. Did you become interested? A. No.

Q. Did you have anything to do with it? A. No.



Two regular Phonographs
joined by Flexible tube
thus making Duplicator

Q. You do not know whether that was operated commercially or not? A. No, I do not, but I think it was afterwards

Q. When did you next see a duplicating machine? A. Well, that's a puzzler. I think that I saw one at the Edison Factory in 1894, and I am sure that I saw one made by Walter Miller on the lines of the old Edison mechanical duplicator with some slight changes in 1896.

Q. Referring to the first one which you saw at the Edison Laboratory in 1894, are you able to make a drawing illustrating that? A. No, I do not think I could; I did not see it in operation, I just examined the machine.

Q. And not having seen it in operation, you do not know that it would operate? A. Yes, I do know that it would operate, for the simple reason that I am sufficient of a mechanic to tell at a glance whether a piece of machinery will do what is intended of it.

Q. But you have no knowledge that it ever was operated?

A. O, yes, I have, because it would not be covered all over with the shavings and mess unless it had been

operated.

Q. And that is your only ground for believing the machine had been operated? A. Yes, and we received the output from it.

Q. How do you know it was the output from it? A. I could not swear to it.

Q. Referring now to the machine which you say was made by Walter Miller and which you saw in 1896, where did you see this? A. It was in the Phonograph Record and Supply Company at 98 Reade Street.

Q. That was a concern operated by Miller, and dealing in phonographs and supplies, I presume? A. It was the Phonograph Record and Supply Company.

Q. It dealt in phonographs and supplies, sold them, etc.? A. Yes.

Q. Do you know who made that machine, of your own personal knowledge? A. Walter Miller and Henry Hagen.

Q. How do you know this, because they told you so? A. They not only told me so, I have seen them working and making parts of that machine and similar machines.

- Q. How many times did you see this particular machine which you have referred to? A. Possibly two or three hundred times.
- Q. And you saw it before it was a duplicating machine and after it was completed, did you? A. O yes, saw it operated.
- Q. To what extent did you see it operate? A. In the making of duplicate cylinders.
- Q. Where was this done, in the office or works of the Phonograph Record and Supply Company which you have mentioned? A. It was done in a little room that they had built specially for that purpose; they necessarily had to find a place in the loft which they occupied where there was the least possible vibration from the street, and consequently put it away back in the corner. Afterwards the vibration annoyed them so much that they were obliged to move it into the cellar where there was none.
- Q. Do you know when the Phonograph Record and Supply Company was organized? A. No, I don't, not exactly, but

approximately; in the Fall of 1896 or the Spring of 1897.

Q. Would it surprise you to learn that that Company was not late in organized until the Spring of 1897? A. No, it would not.

Q. ~~Or with~~ ^{Does} this accord with your recollection? A. I think that they began operations before they organized; that is to say, Miller and Hagen started the business up before they were organized; I often have had plenty of opportunities to know the exact date but never took the trouble to ascertain it because they were an offshoot of Maguire & Baucus, Limited.

Q. Do you know ^{how} long it was before they operated under the name of Phonograph Record and Supply Company that Miller and Hagen were associated together? A. Yes, not exactly, but approximately; they had been associated together in the firm called Walcott, Miller & Company from the time of the Receivership taking effect of the old North American Phonograph Company, and they had been

duplicating records by this process during the whole time, or during most of the time that they had split off from the North American Phonograph Company.

COUNSEL FOR COMPLAINANT: Kindly confine your answers to the questions and then state only your personal knowledge.

Q. Do you know how long before the Phonograph Record & Supply Company was organized that Miller and Hagen were associated together and with no one else? A. No.

Q. Would it surprise you to learn that they were not associated together until the latter part of 1897? A.No.

Q. You have seen, I presume, a number of commercial sound records sold in the open market, both original and duplicate records, have you not? A. What is that?

(Question repeated) A. Yes.

Q. Would you say that these were distinguishable by their mere appearance to the ordinary consumer or user of such articles? A. No.

Q. They resembled each other so closely that such differ-

ences as in fact existed would not be apparent to the purchaser? A. No, they would not.

Q. When did you first see a duplicate sound record sold in the open market, or know of such sale? A. In 1892; shortly after the circular was issued by the North American Phonograph Company asking agents or sub-companies to send in originals.

Q. Did you see the records that were actually sold commercially, the duplicate records that were actually sold commercially? A. Yes, sir.

Q. How did you know that they were duplicates, simply by common report? A. No, the chief evidence that they were duplicates lay in the fact that the resemblance to the original was exact, that the originals were made in New York City, and the duplicates were made in Orange, and no originals were made in Orange.

Q. You are now stating, I presume, what was your understanding at that time, as derived from the men whose names you have given in your direct examination, to-wit, Messrs. Lombard, Batchelor, etc.? A. No, Batchelor

had ceased to be connected with it and others connected with the phonograph; yes, in other words, I had the ordering of the originals to be made.

Q. When next, after this, did you know of the commercial sale of duplicate sound records? A. I might say always, because after the time they first appeared on the market every one who bought a record was suspicious that it was a duplicate, and in a great many catalogues issued after that time the various makers of records protested loudly that they made nothing but originals.

Q. That was a common practice, was it? A. Yes.

Q. And therefore the records which they sold, whether originals or duplicates were sold as originals, I presume?

A. In some cases, yes.

Q. You have referred to a machine as the joint production of Messrs. Douglas and Amet; did you ever actually see that machine? A. Not in operation, and not to examine it closely.

records

Q. Did you ever see any duplicate made thereon; I am asking now for your personal knowledge on this

point? A. Well, I have seen a great many records which were assured to have been made on it?

Q. That is not what I wish, will you not say whether you ever saw duplicate sound records made on this particular machine of Douglas and Amet which you say you saw?

A. No; I don't know.

CROSS-EXAMINATION CLOSED.

RE-DIRECT EXAMINATION:

Q. You spoke of a duplicating machine which a Western man brought on in 1893 and sought to interest some people in, was that a mechanical duplicating system? A. Yes, mechanical, by mechanical means. By mechanical means, I mean any system which does not employ a molding process or an electroplating process of any kind.

Q. Well, do you include the two processes. mechanical?

A. How do you mean?

Q. When you speak of mechanical means, would you include as a mechanical means the method of putting two phonographs side by side and connecting the reproducing diaphragm

of one by a tube to the recording diaphragm of the other and so transmitting the sound from one diaphragm to the other? A. Yes, that is a mechanical process.

Q. Well, did the Western machine, the one brought on in 1893, did that have a tube, or were the recording and reproducing points connected directly. Did you see this machine? A. Yes.

Q. Did you see it in operation? A. No.

Q. In order that you may have no misunderstanding as to the term "mechanical duplicating", I would distinguish the two methods of mechanical duplicating by the names of the tube method and the bar method; by the tube method, I mean where a diaphragm connected with a reproducing point is connected by means of a hollow tube to a diaphragm connected with the recording point, and the sound is transmitted by the vibrations of air in the tube; and by the bar method, I mean the connection of the reproducing point and the recording point by means of a bar. Was the Douglas machine that you described of the tube method or the bar method? A. Bar method. The

first Douglas machine was the tube method and the second Douglas machine, as I recollect it, was the bar method. But now, as to whether it was a rigid bar or not, I am not positive but am inclined to think it was not a rigid bar but a series of jointed bars.


Q. And the various machines that you described as having seen since 1893, were they the tube method or bar method? A. Bar.

Q. You stated in one of your answers to one of the questions that when the duplicates began to be made somewhat generally the sellers were apt to tell the public that they were all originals; did the dealers themselves know that this was a fiction and that many of them were duplicates? A. To a certain extent, yes.

Q. Well, was it generally known throughout the trade? A. By all the larger dealers, I think it was; in fact, I am sure it was.

EXAMINATION CLOSED.

Complainant's counsel repeats his objection to the re-direct examination, and it is agreed the entry of the objection is timely.



United States Circuit Court.

Between:-

The American Graphophone
Company - Complainant

And

The United States Phonograph
Company. Defendant

Book No 1.

"Index."

Name
Thomas A Edison

Direct Examination

2.

Cross Examination

7.

UNITED STATES CIRCUIT COURT.

DISTRICT OF NEW JERSEY.

The American Graphophone Co.,	:	
	:	
-vs-	:	IN EQUITY.
	:	
The United States Phonograph Co.,	:	On Patent No., 341,287
	:	
et als.	:	

Testimony on behalf of the defendant, The United States Phonograph Company, taken before Henry D. Oliphant, Esq., Standing Commissioner of said Court, at the Edison Laboratory, West Orange, Essex County, New Jersey, on Monday, the third day of October, 1898, at two o'clock, in the afternoon of that day, pursuant to notice Appearances; on behalf of the defendant, The United States Phonograph Company, Howard W. Hayes, Esq., on behalf of the Complainant, S.O. Edmonds, Esq.

THOMAS A. EDISON, a witness called on behalf of the defendant, The United States Phonograph Company, being duly sworn on his oath, according to law, deposes and says:

DIRECT EXAMINATION. By Mr Hayes :

Q. Mr Edison, you reside in West Orange ?

A. Yes, sir.

Q. And you are the Mr. Edison who took out patents for a talking machine known as the Phonograph ?

A. Yes, sir.

Q. You took out, also, patents in England in regard to features of the same machine ?

A. Yes, sir.

Q. I show you the English patent, No. 1644, dated April 24th, 1878, for recording and reproducing sound, will you look at that and see if that was a patent taken out by you ?

A. Yes, sir.

Q. In that patent appears figure No. 59, will you kindly look at that and please describe what that figure represents ?

A. It shows the method of duplicating phonographic records.

Q. And in a general way what is that method as shown by that figure ?

A. It shows a cylinder upon which a record has been made, and an adjacent cylinder upon which no record has been made; a con-

nection between the two cylinders carries a recording style and reproducing style; the motion is given to the lever by the master record which is transmitted over to the record to be duplicated whereby the indentations are transferred or duplicated upon the blank cylinder by the motions of the lever.

Q. This design as shown there shows no means of revolving the two cylinders or of moving the lever upon which are the record and reproducing point. I call your attention to designs Nos. 12, 13, 14 and 15 in the same patent, and ask you whether it was the intention to use the device shown in figure 59 in connection with similar mechanism as shown in the figures that I have mentioned?

A. It was the intention to use mechanism for rotating the cylinders, and moving the record arm along the cylinders.

Q. Was or was not that mechanism intended to be similar to that shown in designs twelve to fifteen?

A. Yes, sir, somewhat similar, being a screw.

Q. Did you make a model of this design, figure 59?

A. Yes, sir.

Q. Have you that model?

A. Yes, sir, I think we have it around somewhere.

Q. And it can be produced?

A. I don't know, I will have to look and see.

Q. Will you ask some of your men to look for that so that it can be produced at the next hearing?

A. Do you mean the model made at the time of the filing of the English patent ?

Q. I mean the machine made at the time of the filing of the English patent.

A. I think that has been lost, but we have made some since that.

Q. Were those made since that similar in character to the one made at that time ?

A. Very near the same.

Q. Will you have those models looked up for the next hearing ?

A. I will.

Q. Where was this model that was made at the time of the filing of the English Patent, made ?

A. It was made at the Laboratory here.

Q. That was in 1878 ?

A. Yes, it was made after the patent was filed.

Q. The original model was made after the filing of the patent ?

A. Yes, sir.

Q. Do you know how long after ?

A. After we moved to the laboratory.

Q. When was that ?

A. 1882, or 1883, -- 1884, I think.

Q. Then your memory is, that that model was made in 1884 ?

A. I think it was about that time.

Q. Did that machine operate ?

A. Yes, sir.

Q. Successfully ?

A. Not commercially.

Q. When you say not commercially, what do you mean by that ?

A. The quality wasn't sufficiently good to be introduced as duplicates to the public.

Q. But the duplicates were made. Could the sound be heard from them ?

A. Yes, sir.

Q. And it was successful, experimentally then ?

A. Yes, sir, except as to quality.

Q. Do you remember whether that machine was shown to visitors at the Laboratory ?

A. I think not.

Q. I refer now to figure 59 ?

A. I think not.

Q. Which of your men worked on it if you can remember ?

A. I cannot remember.

Q. Well, was the work done on it yourself exclusively or did your men work on it ?

A. My men worked on it.

Q. Under your directions ?

A. Yes, sir.

Q. When were these other models made on the same line which you now have, can you remember ?

A. I think about 1887, or 1888.

Q. Can you remember who was working for you in 1884 when this model of figure 59 was made -- what men were working in that department ?

A. It was made by a French man whose name I cannot recall.

Q. Do you know where he is now ?

A. No, I think I could find him though.

Q. Who could recollect his name ?

A. John Ott.

Q. Was John Ott working for you at that time ?

A. Yes, sir.

Q. I show you a patent of the United States, 341 and 287 and call your attention to claim No.4, which claims a method of copying sound records by causing the record which is to be copied to impress movements corresponding to the recorded sound waves upon a cutting tool, and thereby engraving or cutting out a similar record in the surface of a suitable tablet, substantially as described, and I ask you if the model of No.59, in its operation is covered by that description leaving out of the discussion the question of whether it did not or did not cut ?

Complainant's Counsel objects to the question on the ground that the witness has not been qualified to answer the question.

A. That's an expert question, and I prefer not to answer it.

Q. In this same patent are other claims, No's 14 and 16 of substantially the same character, and the question as to whether this model does or does not come within the language of this claim is also an expert question, and I assume that you prefer not to answer that ?

A. Yes, sir.

MR. HAYES:-- You may cross-examine, but I reserve the right to recall the witness if necessary; for the present I will close my direct examination.

CROSS- EXAMINATION: By Mr. Edmonds.

Q. I understand that the model of the duplicating apparatus which you say you made in 1884, but did not show to every one, was simply one of your experiments conducted in or about that time ?

A. Yes, sir.

Q. And I presume those experiments continued for some time after that ?

A. Yes, sir.

Q. With substantially that type of apparatus ?

A. Yes, sir.

Q. You never used an apparatus of the type illustrated in the British Patent shown you, for the purpose of duplicating records for the market, did you ?

A I tried to.

Q. But failed ?

A. The quality was poor.

Q. And it was therefore a failure for manufacturing blanks for the market ?

A. The quality was too poor to market it commercially.

Q. That is all.

RE - DIRECT.

Q. Upon what kind of blanks were those experiments made, tin-foil or soap blanks ?

A. They were made of tin-foil, wax and a great many blanks.

Q. In the description of figure 59, in the English Patent, I notice that you say in regard to the point which rests upon the blank: "As this travels the faster, the indentations made therein will be longer, and also deeper by the point being at the upper end of the lever;; when you speak of the indentations as being both longer and deeper; was it or was it not that in this indentation you wished to preserve the same relative proportion of length and depth as in the original ?

A. No, I wanted to make them louder.

Q. You didn't quite understand my question; in the duplicate and indentations are described as being longer and deeper; was or was not your intention in making them longer and deeper, to make the depth and length of the same proportion as in the original ?

A. Yes, sir.

Sworn to before me,

Thomas A. Edison.

(the signature being waived)

this 3rd. day of October, 1898

at Orange, N. J.

A D J O U R N E D.

UNITED STATES CIRCUIT COURT,
For the District of New Jersey.

AMERICAN GRAPHOPHONE COMPANY,

-against-

Patent 341,287.

UNITED STATES PHONOGRAPH COMPANY and
ANOTHER.

Testimony taken on behalf of the defendant, United States Phonograph Company, before S. D. Oliphant, Esq., Standing Examiner, this 5th day of October, 1898, at No. 26 West 24th Street, New York City.

APPEARANCES:

For the defendant, United States Phonograph Company,
Howard W. Hayes, Esq.,

For the complainant, S. O. Edmonds, Esq.

CALVIN G. CHILD, a witness called on behalf of the defendant, United States Phonograph Company, being duly sworn, deposes and says:

DIRECT-EXAMINATION BY MR. HAYES:

Q 1. Mr. Child, where do you reside? A In New York.

Q 2. How long have you been connected with the phonograph business? A Since June, 1889.

Q 3. With what company were you then connected? A New

England Phonograph Company of Boston, one of the sub-companies of the North American Phonograph Company of New York, until January, 1894.

Q4. This New England Phonograph Company was one of the licensee companies that received contracts for territorial rights from the North American Phonograph Company, was it not?

MR. EDMONDS: Objected to as immaterial, and further on the ground that the witness is not qualified to answer the question.

A. Yes, sir.

Q5. What were your duties in connection with your employment with the New England Phonograph Company? A I was first an inspector of machines, and after the making of musical records was commenced I had charge of the recording department of the New England Phonograph Company.

Q6. When you say "musical records" you mean, do you not, the record of music, either instrumental or vocal, or recitations, that was taken on cylinders on the phonograph, to be used afterwards for reproduction for amusement purposes?

A Yes sir.

Q7. After you left the New England Phonograph Company about January, 1894, into whose employ did you then go?

A I then went into the employ of the Columbia Phonograph Company of Washington, D. C.

Q8. Was that company also one of the sub-companies having contracts for territorial rights from the North American Phonograph Company?

MR. EDMONDS: Same objection.

A Yes sir.

Q9. When you were in the employ of the New England Phonograph Company what musical organization made the most and best of their records? A The principal part of our record work was in the making of records from a section of Baldwin's Boston Cadet Band.

Q10. What reputation have those records in the trade?

A They are considered to be the best concerted instrumental records that have ever been made.

Q11. Do you remember what kind of blanks were used for taking the records from that band? A The blanks purchased from the Edison Phonograph Works of Orange, New Jersey.

Q12. What was the color of those blanks at that time?

A At that time nearly all the blanks which we received were of a dark brown color--very dark. There were a few lighter blanks used in the early part of the record-making, but almost all the blanks were very dark.

Q13. Do you know what was the color of blanks afterwards put out by the Edison Phonograph Works? A A nearly white blank; it was an experimental light blank; it was put out for a while and then they went back to the dark blank.

Q14. Could you distinguish by inspection the dark colored blanks that were put out at the time these records were taken from the Baldwin Cadet Band, from the lighter colored blanks that were afterwards put out by the works? A Very readily.

Q15. When you went into the employment of the Columbia Phonograph Company who was the president of that company? A. Mr. Edward D. Easton.

Q16. And who was the secretary? A. R. F. Cromelen.

Q17. Who was the manager? A Frank Dorian.

Q18. Do you know who is the President of the American Graphophone Company? A I believe Mr. Edward D. Easton is the present president of that company.

Q19. Do you know how long he has been identified with that company? A For some time prior to my connection with the Columbia Phonograph Company.

Q20. Where did the American Graphophone Company have its factory? A At Bridgeport, Connecticut.

Q21. Were its machines and blanks made at that factory?

A The machines were all made there at the time of my joining the Columbia Phonograph Company. They were then experimenting in the manufacture of blanks at the American Graphophone Company, and had not at that time made any blanks which were fit for the recording of musical records.

Q22. Where were these experiments being made? A At the American Graphophone Company in Bridgeport.

Q23. What were your duties in connection with your employment by the Columbia Phonograph Company? A Superintendent of the musical department; that is, my duties were the making and testing of records and the securing of talent and making arrangements with them, subject to the approval of Mr. Easton and Mr. Dorian as to financial terms and so forth.

Q24. In 1894 did you have any dealings, or did the Columbia Phonograph Company have any dealings with the United States Phonograph Company? A Yes sir; they were buying records in quite large quantities from them.

Q25. Do you know whether any of the records you purchased from the United States Phonograph Company were duplicates, and not originals? A Yes, sir.

Q26. How do you know that? A Shortly after my return from the first vacation which I had when with the Columbia Phonograph Company, in the last two weeks of August, 1894--mak-

ing it some time in the early Fall of that year--I was looking through the stock with a view to making up a list of records to be made, and found a box of records by the Manhasset Quartette which had been purchased from the United States Phonograph Company. These records had a somewhat shiny appearance, which was a characteristic of duplicates made at that time, and I called Mr. Dorian's attention to the fact that the United States Phonograph Company was furnishing them with duplicates. Mr. Dorian at first hardly thought it possible, but after looking at the records with me was convinced that they were duplicates, and called Mr. Easton's attention to the fact.

Q27. Do you know whether there was any correspondence between Mr. Easton and the United States Phonograph Company in regard to these duplicates? A Yes, sir; Mr. Easton wrote to the United States Phonograph Company, and I saw a letter from them in reply to his letter, which did not admit that the records were duplicates, but asked why Mr. Easton should think they were duplicates, and asked if they were not good and clear and loud, smooth and distinct and perfectly saleable records in every way. That was the purport of the letter as nearly as I can remember it.

Objection reserved.

Q28. Do you remember any further correspondence in regard to these duplicates? A. That was the only letter which I saw in regard to these duplicates, but Mr. Easton corresponded with Mr. Tewksbury on the matter, and told me that Mr. Tewksbury had admitted that they were duplicates, claiming that a number of duplicates made from a good master would average better than ten or twelve records made from ten or twelve machines at one time; and Mr. Tewksbury, of the United States Phonograph Company, sent to Mr. Easton a dozen records which he said were duplicates, asking Mr. Easton's comment and criticism upon them.

Q29. Were any records purporting to be made by the Baldwin Cadet Band shown to you as having come from the United States Phonograph Company? A. There was one record purporting to be made by the Baldwin Cadet Band, which was shown to me by Mr. Easton, but which he did not state at first was from the United States Phonograph Company. He asked me if it was a record which I had made, and I told him no. He asked me if I thought the record had been made since I left Boston, and I also told him no. He then asked me what my opinion was in regard to it, and I told him that it was a duplicate, and on his asking me why I thought it was a duplicate I told him that it was made upon a blank of a very light

color, which had been made since the Cadet Band had made any records; that during the Spring and Summer of 1894 the Cadet Band had not played for the New England and Phonograph Company for the purpose of making records, and that all their records were made upon the dark blanks, and that therefore this record could not possibly have been played by the Cadet Band. Mr. Easton then admitted that it was a duplicate which had been sent to him from the United States Phonograph Company.

Q.30. After these conversations between you and Mr. Easton at which it was stated that some of the records furnished by the United States Phonograph Company were duplicates, were further duplicates purchased by the Columbia Phonograph Company from the United States Phonograph Company? A Yes, sir, frequently.

Q31. And were any of them taken to the factory of the American Graphophone Company at Bridgeport? A A number were taken to the American Graphophone Company in Bridgeport and duplicated from and carried in stock by the Columbia Phonograph Company and sold to patrons.

Q32. How did you get your knowledge that these duplicates purchased from the United States Phonograph Company were taken to the factory of the American Graphophone Company

in Bridgeport? The first knowledge I had that they were taken there before they were used for making stock duplicates was that Mr. Easton went frequently to Bridgeport while experiments were being made in a duplicating machine, and returned with duplicates which were made in Bridgeport, and compared them in Mr. Cromelen's and Mr. Dorian's presence, and my own presence, with duplicate records received from the United States Phonograph Company.

Q33. Were you about that time sent to the factory of the American Graphophone Company at Bridgeport? A Some time later than that I was sent to the American Graphophone Company in Bridgeport--either in January or the early part of February of 1895.

Q34. What did you do there in connection with these records? A I was sent there for the purpose of testing and examining blanks which Mr. McDonald, the superintendent of the factory, was making, and to compare these blanks with blanks received from the Edison Phonograph Works.

Q35 How did these blanks that you inspected and tested at that time, compare with the blanks from the Edison Phonograph Works? A They were very inferior and very rough, and a large number of them which were shipped to Washington afterwards, and on which I made records, acquired what is called

in the talking machine business a "blue rot"--a fuzzy scum which grows on the surface of the record, and some 1200 records which I made of Mr. Dan W. Quinn, who came from New York shortly after my return from Bridgeport, had to be destroyed as they showed so much of this defect that they were utterly unsalable.

Q36. So far as your inspection of them developed, were these blanks that were made by the American Graphophone Company of a character to make them capable of being sold successfully commercially? A Not at that time. There was one lot of blanks which seemed to have very much the appearance of Edison blanks, although they were re-molded in the shape which was used by the Columbia Phonograph Company, a slightly different taper, at that time; but while we received a few of those blanks--possibly half a barrel--Mr. McDonald was never able to make them in any quantities, and to the best of my knowledge they were Edison blanks which were melted over.

Q37. And those blanks of which the material was made by the workmen of the American Graphophone Company, and were not re-molded over from the Edison blanks--were they a successful and commercial article? A In my opinion, they were utterly unfit for record work in the recording of musical

sounds of any kind.

Q38. At this time in January or February, 1895, that you went to the factory, did you do anything in connection with inspecting duplicates made there? A During the week that I was there Mr. Easton and Mr. Cromelen came to the factory together, and while they were there Mr. Cromelen brought into a small room, where I was testing and shaving these blanks, four records, with a request that I examine them and pick out the original from the four. I told Mr. Cromelen that they were all duplicates from a record of Issler's Orchestra, of a selection, the "Washington Post March".

Q39. By whom were the records of Issler's Orchestra made at that time? A They were made by the United States Phonograph Company of Newark, New Jersey. I know that from having purchased the records for personal use and having received records in a complimentary way from V. H. Emerson, who was the record taker for the United States Phonograph Company, and from having purchased these records for the New England Phonograph Company.

Q40. Do you know where these four records which you pronounced duplicates were made? A They were made at the factory of the American Graphophone Company, in the experimental room, by a man whose name is either Northcott or Norcross; I am not quite sure about the name.

Q41. How do you know that fact? A I know that fact because Mr. Cromelen tried to trip me on the records; that is, he told me that I was making a mistake when I said they were all duplicates and that it was a very serious question and he advised me very strongly to change my opinion. This gentleman, who was the experimental man in the mechanical line for the American Graphophone Company, told me on the following day that I was perfectly right; that the duplicates had been made by him.

Q42. Did you see the machine that the American Graphophone Company were then using in Bridgeport in an attempt to make duplicates? A Yes, sir, I saw the machine.

Q43. What was the general character of it? A As nearly as I can say, it was a phonograph with two mandrels, one containing a record, or holding a record, and the other holding a blank, with a mechanical hinge connection without diaphragms, and as the record revolved a reproducing point raised in it, pushed a recording point at the other end of this hinge into the other cylinder, and made synchronously a similar record.

Objection reserved.

Complaint's now utters timely objection to the whole of the foregoing deposition, on the ground that it is incompetent, irrelevant and immaterial; and on the fur-

ther ground that the major portion of it is hearsay. Subject to these objections, complainant's counsel proceeds to cross-examine.

CROSS-EXAMINATION BY MR. EDMONDS:

XQ44. As I understand you, Norcross said that he made the four duplicates about which you testified? A Yes, sir.

XQ45. Did you see him make them? A No, sir.

XQ46. Did you see the master record from which he made them? A No, sir, I did not.

XQ47. Do you know, of your own personal knowledge, whence he procured that master record? I am not asking you now for what you inferred from other facts? A No, sir; I could not say positively where that master record was procured, because large numbers of that selection were ordered by the Columbia Phonograph Company from the United States Phonograph Company. The records were sent to Washington, were sorted and tested there and the best of them picked out and sent to Bridgeport, and we received large numbers of duplicate records from the American Graphophone Company of Bridgeport--records not only of the United States Phonograph Company, but of Walcutt & Leeds of New York.

XQ 48. Did you order those records from the United States Company yourself, and on behalf of the Columbia Company?

A No, sir; I ordered no blanks and ordered no records.

XQ49. And you did not receive them? A I did not receive them; I was not in the shipping department. I frequently was requested to examine them.

XQ50. And that is the source of your information? A Yes, sir.

Complainant's counsel now further objects to any testimony given by this witness concerning transactions between the Columbia Phonograph Company and the United States Phonograph Company, as incompetent.

XQ51. As I recall your direct--examination, you were employed by the New England Company from the Spring of 1889, until about January, 1894; is that true? A Yes sir.

XQ52. And during that time it was your business to see to the making of records for that Company? A Yes, sir.

XQ53. Did you personally see to the making of all of those records? A Yes, sir.

XQ54. None was made by that company except by you? A Except by me or assistants who were working under me.

XQ55. That is to say, you did not personally supervise every detail of the record making during those years, but that you supervised it generally and were assisted by other workmen in the employ of the company? A I practically personally

supervised every record that was made for the New England Phonograph Company during the time I was with them.

XQ56. Are you willing to swear that you saw every record?

A That I saw every record?

XQ57. Yes? A Yes, sir; I would be willing to swear that I saw every record that was made by the New England Phonograph Company except during periods in the Summer when I was away on my vacation; and my impression is that no records were made during that time. During the time I made records for the New England Phonograph Company I had as my assistant Mr. John H. Foote, of Boston, who is at present with the New England Phonograph Company, and he and I together made the records and tested them together. Of course I did not test every record; but every record was removed from the machines --especially every Cadet Band record--under my personal supervision.

XQ58. During the time you were connected with the New England Company did you make any duplicate records or handle any? A Yes, sir; we made a few duplicate records of some cornet records, and also a few duplicates of a record which was made for me by Miss Rose Coghlan, of "The Charge of the Light Brigade". These duplicates were made by connecting two phonographs with a short piece of rubber tubing and transmitting the sound waves from one machine to the other,

and not by a mechanical connection.

XQ59 Did you sell those duplicates? A Some of them were sold and some of them were given away. I believe only one of the Rose Coghlan records was sold.

XQ60 Were those records which you sold, sold as duplicate records or as originals? A They were sold as originals, nothing having ever been done to any extent at that time in the duplicating line, and people not knowing whether they were duplicates or not.

XQ61 Is it not a fact that the New England Phonograph Company, or Col. Sampson, or some other officer connected with that Company during the period that you were in its employ, advertised more or less extensively that it did not deal in duplicate records, but confined its sale to originals? A No, sir, not till after I left. the New England Phonograph Company. Duplicating was very little done, and the only duplicates which the New England Phonograph Company carried in stock up to the time of my leaving it were some duplicate records made from originals which I made from the voice of R.J. José, the Tuxedo Quartette tenor, and from the Tuxedo Quartette, composed of Messrs. José, Moore, Lewis and Frilman. These originals were made in Boston and were sent to the Edison factory at Orange, New Jersey, and were there duplicated in quite large quantities, the duplicates and

originals being returned to the New England Phonograph Company.

XQ62. What do you mean by "afterwards" in your last answer? A I mean, until I left the New England Phonograph Company they did not advertise the fact that they dealt exclusively in original records. Some time after I left the New England Phonograph Company they began making records again and got out a form of ticket for the Baldwin Cadet Band records, with a monogram of the New England Phonograph Company in the corner, and printed on this slip was a guarantee that the record was an original Baldwin Cadet Band record.

XQ63 At that time it was quite common, was it not, for concerns dealing in records to insist that its output was composed of originals, regardless of whether they were originals or duplicates? A Not up to the time of my leaving the New England Phonograph Company and going to Washington to work for the Columbia Phonograph Company; very little was known then and every little openly done in duplicating; the general public knew very little about duplicating.

XQ64. It was only after the public found out that there was such a thing as a duplicate record, that the dealers began to insist that their records were original? A Yes.

XQ65. And this was common practice? A Yes, sir.

RE-DIRECT-EXAMINATION BY MR. HAYES:

RDQ66. About what time did the selling of duplicates become common in the trade? A I should say in the Fall of 1894, although considerable of it had been done prior to that, but not advertised as duplicate records and not generally known as duplicate records.

RDQ67. After the fact that duplicate records were made began to be known, and the various large dealers advertised commonly that they dealt in nothing but originals, was it known in the trade that although the records were put out as originals, in fact many of them were duplicates? A Yes, sir.

RDQ68. Who had charge of the shipping department of the Columbia Phonograph Company at the time that these duplicates and originals were gotten from the United States Phonograph Company? A I don't remember exactly who was in charge of the shipping department or the order department at that time. A Mr. Charles Wilber, who was making some records at the time I first went there--and who was afterwards sent to New York to Walcutt & Leeds and to the United States Phonograph Company in New York, to select records which were sent to Bridgeport--had, I think, at that time charge of the record room and the record stock.

RDQ69. Then he would be the person who would have personal knowledge as to what duplicate records, and when and how many, were gotten by the Columbia Phonograph Company from the United States Phonograph Company, you think? A He would, up to the time of his going to Atlantic City to take charge of the Automatic Parlor which was opened there.

RDQ70 About when was that? A I think that that was in the Summer of 1895.

RDQ71. When were the duplicates first made by the Edison Phonograph Works for the sub-companies, if you knew?

MR. EDMONDS: Objected to as improper on re-direct.
A I believe in 1892; that is the time in which they made the duplicate records for the New England Company of José and the Tuxedo Quartette.

RDQ72. That was in 1892? A Yes, sir, I think that was the date of it.

RDQ73. Did you say that John H. Foote is still in the employ of the New England Phonograph Company? A Yes, sir.

RE-CROSS BY MR. EDMONDS:

RDQ74. You have no personal knowledge of the manufacture of duplicates at the Orange works, I presume? A None whatever.

Testimony closed, reserving the right to recall
the witness.

CALVIN G. CHILD.

1001 Feb. — 0-225

STENOGRAPHER'S MINUTES. A-394

UNITED STATES CIRCUIT COURT,
For the District of New Jersey.

AMERICAN GRAPHOPHONE COMPANY,

BEFORE

-against-

No. 341,287.

UNITED STATES PHONOGRAPH COM-
PANY, ET AL.

New York, October 10, November 4, 1898

Witnesses :

Direct. Cross. Re-Direct. Re Cross.

EDWARD D. EASTON,

21

PHILIP MAURO,

29

37

HENRY J. HAGEN,

96

103

VAN DEMARK & PALMER,

STENOGRAPHERS,

111 BROADWAY, NEW YORK.

TELEPHONE, 3166 CORTLANDT

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UNITED STATES CIRCUIT COURT,
For the District of New Jersey.

-----	:	
AMERICAN GRAPHOPHONE COMPANY,	:	IN EQUITY.
	:	
-against-	:	On Patent
	:	
UNITED STATES PHONOGRAPH COMPANY, et al.	:	No. 341,287.
-----	:	

Testimony taken on behalf of the defendant, United States Phonograph Company, before S. D. Oliphant, Esq., Standing Examiner, this 10th day of October, 1898, at No. 11 Broadway, New York City.

APPEARANCES:

For the defendant, United States Phonograph Company,
Howard W. Hayes, Esq.,

For the complainant, Messrs. S. O. Edmonds and Philip Mauro.

EDWARD D. EASTON, a witness called on behalf of the defendant, United States Phonograph Company, being duly sworn, deposes and says:

DIRECT-EXAMINATION BY MR. HAYES:

Q 1. Where do you reside? A Arcola, Bergen County, New Jersey.

Q2. Are you connected with the American Graphophone Com-

pany? A. I am.

Q 3. In what capacity? A President and General Manager.

Q 4. Are you also a director? A I am.

Q 5. Are you a stockholder? A I am.

Q 6. How long have you been a stockholder in the American Graphophone Company? A Ever since its organization.

Q 7. Please state as well as you can, the various offices you have held in connection with the American Graphophone Company, and the approximate dates between which you have held these offices? A I have been a director most of the time since the organization of the Company. I became General Manager about five years ago, and President shortly after becoming General Manager.

Q 8. Have you the data from which a list of the officers and directors of the American Graphophone Company from the time of its incorporation, to the present time, can be ascertained? A I have.

Q 9. Are you connected with the Columbia Phonograph Company? A I am.

Q 10. In what capacity? A As President from the date of its organization.

Q 11. Have you been a director of the Columbia Phonoc-

graph Company from the date of its organization? A I have.

Q 12. Have you data from which a list of the directors and officers of the Columbia Phonograph Company from the time of its organization to the present time, can be ascertained?

A I have.

Q 13. Are you connected with the Columbia Phonograph Company General? A I am.

Q 14. In what capacity? A As President.

Q 15. Are you a director of that Company? A I am.

Q 16. Have you data from which a list of the officers and directors of that company from the date of its organization to the present time, can be ascertained? A I have.

Q 17. Are you a stockholder in the Columbia Phonograph Company? A I am.

Q 18. Are you a stockholder in the Columbia Phonograph Company General? A I am.

Q 19. While you were President of the Columbia Phonograph Company, were you cognizant of its affairs? A I was.

Q 20. Were you active in its management? A I was.

Q 21. During the time you have been connected as an officer with the American Graphophone Company, were you cognizant of its affairs? A I was.

Q 22. And active in its management? A Yes sir.

Q 23. During the time you have been connected with the Columbia Phonograph Company General, were you cognizant of its affairs? A Yes sir.

Q 24. And active in its management? A Yes.

Q 25. Please give a list of the officers and directors of these three companies from the time of their incorporation to the present time, giving the dates during which each one of these officers and directors held their positions.

OFFICERS OF COLUMBIA PHONOGRAPH CO., WITH DATES OF ELECTION.

President.

Vice-President & Treasurer.

E. D. EASTON, Jan. 15, 1889.

WM. HERBERT SMITH, Jan. 15, 1889.

Secretary.

AARON JOHNS, Jan. 15, 1889.

R. F. CROMELIN. Oct. 23, 1889.

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OFFICERS OF COLUMBIA PHONOGRAPH CO., GENL., WITH DATES OF ELECTION.

President and Treasurer.

Vice-President and Genl. Mgr.

E. D. EASTON, May 26, 1894.

R. F. CROMELIN, May 25, 1894.

Secretary.

FRANK DORIAN, May 25, 1894.

-----oOo-----

OFFICERS OF THE AMERICAN GRAPHOPHONE CO., FROM TIME OF ORGANIZATION TO PRESENT TIME, WITH DATES OF ELECTION.

President.

JAS. G. PAYNE, June 27, 1887.
 SAML. M. BRYAN, Oct. 14, 1892.
 C. J. BELL, Oct. 9, 1893.
 E. D. EASTON, Apl. 8, 1895.

Vice-President.

J.H.SAVILLE, June 27, 1887.
 C. J. BELL, Oct. 13, 1890.
 E. D. EASTON, Oct. 9, 1893.
 WM. E. BOND, Apl. 8, 1895.

Treasurer.

N. WILSON, June 27, 1887.
 C. J. BELL, June 14, 1890.
 WM. H. SMITH, Oct. 17, 1895.

Secretary.

A. MERR, June 27, 1887
 MR. WHITE, Oct. 15, 1888
 JAS. A. BATES, Oct. 13, 1890.
 E. D. EASTON, June 27, 1892
 A. H. SPEAKE, Nov. 1892
 E. D. EASTON, May 13, 1893
 F. DORIAN, Apl. 8, 1895
 H. A. BUDLONG, Dec. 24, 1895
 W. E. FISHER, June 9, 1896
 P. H. CROMELIN, Nov. 9, 1896
 T. J. GODWIN, Jan. 11, 1898

General Manager.

J.H.SAVILLE, June 27, 1887.
 J. G. PAYNE, Oct. 13, 1890.
 C. S. TAINTER, June 27, 1892.
 CHAS. FLINT, Nov. 1892.
 E. D. EASTON, Apl. 10, 1893.

Counsel.

JAS. G. PAYNE, Oct. 12, 1887
 E. D. EASTON, Oct. 17, 1895

E. D. EASTON was elected a Director Oct. 14, 1889.

NAMES OF DIRECTORS OF COLUMBIA PHONOGRAPH COMPANY FROM DATE OF
ORGANIZATION TO OCTOBER 8th, 1898.

Directors elected at organization, February 12th, 1888.

WM. HERBERT SMITH,
A. JOHNS,
E. D. EASTON,
BENJ. DUMFEE,
CHAPIN BROWN.

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Annual meeting, October 21, 1889. All then serving as
Directors re-elected.

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Annual Meeting, October 20, 1890. All then serving as
Directors re-elected.

-----o-----

Annual meeting, October 19, 1891. The only change in the
Board of Directors was the election of MR. CHAS. H. RIDENOUR in
place of MR. A. JOHNS.

(All re-elected thereafter, and still in service).

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NAMES OF DIRECTORS OF COLUMBIA PHONOGRAPH COMPANY GENERAL FROM
DATE OF ORGANIZATION TO OCTOBER 8th, 1898.

R. F. CROMELIN, :	Elected May 25th, 1894,
WM. E. BOND, :	
E. D. EASTON. :	on organization, and all

WM. HERBERT SMITH, :
 ANDREW DEVINE. : still in service.

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NAMES OF DIRECTORS OF AMERICAN GRAPHOPHONE COMPANY FROM DATE OF
 ORGANIZATION TO OCTOBER 13th, 1890.

Directors elected at organization, January 25, 1887.

JAMES G. PAYNE,
 GARDNER G. HUBBARD,
 AUSTIN HERR,
 JOHN H. WHITE,
 JAS. O. CLEPHANE,
 NATHANIEL WILSON.

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October 8th, 1888. Directors elected at annual meeting.

JAS. G. PAYNE,
 JAMES H. SAVILLE,
 NATHANIEL WILSON,
 AUSTIN HERR,
 ANDREW DEVINE,
 JOHN H. WHITE,
 CHAS. J. BELL,

-----0-----

October 14, 1889. Directors elected at annual meeting.

JAS. G. PAYNE,
 NATHANIEL WILSON,
 ANDREW DEVINE,
 JOHN H. WHITE,
 CHAS. J. BELL,
 E. D. EASTON,
 JAS. A. BATES.

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October 13, 1890. Directors elected at annual meeting.

JAS. G. PAYNE,
ANDREW DEVINE,
JOHN H. WHITE,
CHAS J. BELL,
JAMES A. BATES,
E. D. EASTON,
R. O. HOLTZMAN,

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A. G. Co., DIRECTORS, WITH DATES OF ELECTION TO OCT. 10, 1893.

S.M. BRYAN,	Feb. 2, 1892.
C.S. TANTER,	"
G. G. HUBBARD,	June 27, 1892.
WM. B. GURLEY,	"
WM. E. BOND,	Oct. 1893.
FRANK L. HALL,	May 15, 1894.
J. J. PHELPS,	Oct. 8, 1894.
ANDREW DEVINE,	Apl. 3, 1895.
R. F. CROMELIN,	"
WM. HERBERT SMITH,	Apl. 29, 1895.
F. DORIAN,	Nov. 9, 1895.
M. E. LYLE,	Jan. 15, 1897.
F.J. Warburton,	Oct. 11, 1897.
PHILIP MAURO,	Oct. 11, 1898.

(Signed) E.D.EASTON.

UNITED STATES CIRCUIT COURT.

For the District of New Jersey.

AMERICAN GRAPHOPHONE COMPANY,	:	IN EQUITY.
-against-	:	On Patent No. 341287
UNITED STATES PHONOGRAPH COMPANY, et al.	:	

Testimony taken on behalf of the defendant, United States Phonograph Company, before S. D. Oliphant, Esq., Standing Examiner, this 4th day of November, 1898, at No. 11 Broadway, New York City.

APPEARANCES:

For the defendant, United States Phonograph Company,
HOWARD W. HAYES, ESQ.

For the complainant, MESSRS. S. O. EDMONDS AND PHILIP MAURO.

P H I L I P M A U R O, a witness called on behalf of the defendant, United States Phonograph Company, being duly sworn, deposes and says:

DIRECT-EXAMINATION BY MR. HAYES:

Q 1. You testified as a witness for the complainant in this suit, and stated that after Mr. Edison brought out the perfected phonograph, and before an arrangement was made be-

tween the owners of the patents of Bell and Tainter and Mr. Lippencott, that you prepared papers for a suit to restrain the using and vending of the phonograph, and in your testimony you stated that you would not produce those papers without the order of the court. I now ask you to produce those papers.

A. The statement made in your question is in its main features correct. At the time to which you refer, namely, 1888, preparations were made by the then counsel of the American Graphophone Company, or rather, of the Volta Graphophone Company, ^{its} predecessor in title, to commence suit against persons making or using the machine known as the improved phonograph. I do not remember to have stated that I made those preparations myself, and while I had a part in them, it was in the capacity of an employee in the office of Mr. Pollock who was then counsel for the complainant company. I would like to ask counsel before answering the question for what purpose he wishes the papers produced?

Q2. Counsel for defendant states that he considers those papers as evidence bearing on the issues raised in the case in regard to the estoppel in favor of the defendants, set up in the defendants' answer.

A. The witness further answering, says, at the time of my first deposition in this suit, I believe that I stated that I thought the papers were in existence, and might be discovered

on further search. I have since made a search and have found the papers to which I referred, or some of them, at least, and have them in my possession.

Complainant's counsel requests counsel for defendant to state upon the record whether he does or does not propose putting those papers, if produced by the witness, in evidence. It is assumed that defendant's counsel is not requesting the production of the papers in question for his own private inspection and unless this is so, the witness will be instructed to decline to produce them.

In reply defendant's counsel would state that under the well known rules of evidence, where papers are produced by one side at the request of the other, that, of itself, puts them in evidence, and defendant's counsel expects, if the papers are produced, that they shall be in evidence in the case.

(Witness) I am willing to produce before the court any papers in my possession which offer evidence upon the issues in this suit, but under advice, I do not feel called upon to produce papers for the mere purpose of showing them to counsel on the other side.

Q3. Counsel for defendant states that the offer of the witness to produce the papers before the court is all that counsel for defendant asks for, assuming that producing them

before the court; means the publishing of the evidence before the close of the testimony on behalf of defendant.

A: Responding to the call of counsel, I here produce, first, a partly completed draft of a bill of complaint; second, an affidavit of Charles Sumner Tainter verified June 18, 1888; third, an affidavit of Emile Berliner, verified June 21, 1888 being the same affidavit which was printed as part of the record in the suit between this complainant and the Edison Phonograph Works; and fourth, an affidavit of Henry G. Rogers, verified June 26, 1888, these being all the papers to which I referred in my former deposition and which I have been able to find. I believe that they are all the papers that were prepared at that time.

The witness has endorsed these papers with the numbers which he stated in producing them, and identified them by his initials.

Q4. How long have you been counsel for the American Graphophone Company?

A. Personally, since about February, 1893.

Q5. Were you one of their counsel in the suit brought by that company against the Edison Phonograph Works in the District of New Jersey?

A. I was.

Q6. Also were you counsel for the American Graphophone

Company in the suit brought by them on their patent against the United States Phonograph Company in the District of New Jersey?

A. Yes.

Q7. Did you take part in the settlement made between the American Graphophone Company and the Edison Phonograph Works of this suit?

A. I did.

Q8. When was that suit settled?

A. In December, 1896.

Q9: There was an agreement, was there not, entered into between the Edison Phonograph Works, the National Phonograph Company, and the American Graphophone Company in settlement of that suit?

A. There was.

Q10. Where was that agreement finally executed?

A. It was executed on the part of the American Graphophone Company in New York City. I was not present at its execution by the other parties thereto.

Q11. And by whom was it executed on behalf of the American Graphophone Company?

A. By the President Mr. E. D. Easton, and the Secretary at the time being.

Q12. Who was present at the time of its execution on behalf of the American Graphophone Company?

A. I have an impression that I was present, but I am not even sure as to that. I don't know who else was present.

Q13. Do you know whereabouts in New York City it was executed on behalf of the American Graphophone Company?

A. I am not certain as to that. The matter could be easily ascertained, I think.

Q14.. By whom were the negotiations carried on on behalf of the American Graphophone Company, and on behalf of the Edison Phonograph Works, and the National Phonograph Company?

A. On behalf of the American Graphophone Company, by myself; on behalf of the other parties by Mr. R. N. Dyer and Mr. S. O. Edmonds.

Q15. Were you present at the final conference when the terms of that agreement were settled upon between the respective parties?

A. I was.

Q16. Where did that conference take place?

A. I feel pretty sure that it took place in New York City, at the office of Mr. Dyer.

Q17. Was there a conference in regard to the terms of that settlement at the Waldorf Hotel, in New York City?

A. No; the papers were exchanged after they had been executed, at the Waldorf Hotel.

Q18. Then the final delivery of the papers took place at

the Waldorf Hotel, in New York City?

A. Yes.

Q19. Was that in the day-time or in the evening?

A. I think it was in the evening.

Q20. Who was present at the time of the exchange of these papers?

A. Mr. Easton, Mr. R. N. Dyer, Mr. S. O. Edmonds, Mr. George Dyer and myself.

Q21. This occasion that you refer to when the papers were exchanged, was the time, was it not, when the agreement became operative?

A. I presume so; it was the time at which they were actually delivered; I presume they went into effect from that moment.

Q22. This agreement that was delivered at that time was the outcome of the negotiations of which you speak, that took place at the office of Mr. Dyer, was it?

A. There were a number of conferences between myself and counsel for the other parties, and more or less correspondence, of all of which this agreement was the final outcome.

Q23. Is this agreement about which you have testified, the one that appears in the defendant's papers on the motion for the preliminary injunction in this case?

A. Without comparing with the original, I should say

that the agreement printed beginning on page 5 of the affidavit of Mr. Hayes in this case is a copy of the agreement about which I have been testifying.

Q24. Are you familiar with a later agreement made between the American Graphophone Company and the Edison Phonograph Works and the National Phonograph Company in regard to making duplicate records? I refer to an agreement that is spoken of in the complainant's motion papers for a preliminary injunction in this case, where it is stated that a shop-right was granted to either the Edison Phonograph Works or the National Phonograph Company?

A. Yes, I am familiar with that paper; I believe I had a part in its preparation.

Q25. Can you produce a copy of that agreement?

A. No, I cannot.

Q 26. Do you know if the American Graphophone Company has possession of that agreement, or a copy of it?

A. I do not, although I have no doubt that, as the records of that company are kept with some care, that a copy of it is in its proper place.

Q27. What officer of the company would have possession of that agreement, or a copy of it, if you know?

A. If you mean physical possession, I don't know; if you mean control it, I should say the President had the control of

it.

Q28. I ask you, as counsel for the complainant, to produce that agreement or a copy of it, in order that the defendant may offer it in evidence. I ask this to save the trouble of subpoenaing the President or other officer of the Company to produce it.

A. As this is a matter with reference to which others must be consulted, I will take it under consideration and produce the paper as you request unless some sufficient reason for not doing so appears.

MR. HAYES: The direct-examination is closed except so far as the production of this paper is concerned, the defendant's counsel reserving the right to recall the witness if it shall seem necessary in connection with this paper last spoken of.

(Witness) The witness adds, I desire to say further that as this is an agreement between two parties, I do not feel that the matter of its production and publication rests entirely with the American Graphophone Company, otherwise I could give my answer to the request very shortly.

CROSS-EXAMINATION BY MR. EDMONDS:

XQ 29. Kindly read on the record the papers produced by you in response to the demand of defendant's counsel.

A. I do so: They are as follows:-

P. M. EXHIBIT NO. 1.

CIRCUIT COURT OF THE UNITED STATES,

DISTRICT OF

I N E Q U I T Y.

THE VOLTA GRAPHOPHONE COMPANY, ET AL. :

-vs-
:

BILL OF COMPLAINT.

To the

JUDGES OF THE CIRCUIT COURT OF THE UNITED STATES
FOR THE DISTRICT OF

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The Volta Graphophone Company, a corporation duly organized under the laws of the State of Virginia, and having an office for the transaction of business in Washington, in the District of Columbia, and the American Graphophone Company, a corporation duly organized under the laws of the State of West Virginia, and having an office for the transaction of business in Washington aforesaid bring this their bill of Complaint against

And thereupon your orators complain and say that Chichester A. Bell and Sumner Tainter, then of Washington aforesaid, were the original, first and joint inventors of certain new and useful improvements in Recording and Reproducing Speech and other Sounds, which were not known or used in this country, or patented or described in this or any foreign country prior to their invention thereof, and which had not been in public use or on sale in the United States for more than two years prior to their application for Letters Patent therefor.

That on the 27th day of June, 1885, the said Chichester A. Bell and Sumner Tainter made application in due form of law, to the Commissioner of Patents, for the grant of letters patent of the United States for the said invention, and then and there fully complied in all respects with the provisions and requirements of the laws of the United States in such case made and provided.

That, due proceedings being had upon said application, upon the 4th day of May, 1886, Letters Patent of the United States, in due form of law, were issued and delivered to said Chichester A. Bell and Sumner Tainter, in the name of the United States, under the seal of the Patent Office, and signed and countersigned respectively by the proper officers of the United States, and numbered 341,214, granting to said Chichester A.

Bell and Sumner Tainter, their heirs or assignees, for the term of seventeen years from said 4th day of May, 1886, the full and exclusive right to make use and vend the said invention throughout the United States and the Territories thereof, as by reference to said Letters Patent, or a duly authenticated copy thereof, herunto annexed and made part hereof, will more fully and at large appear.

That the said Sumner Tainter, was further the original, first and sole inventor of a certain new and useful Improvement in Apparatus for Recording and Reproducing Sounds or Sonorous Vibrations, not known or used in this country or patented or described in any printed publication in this or any foreign country prior to his invention thereof, and not in public use or on sale in the United States for more than two years prior to his application for Letters Patent therefor;

That on the 4th day of December, 1885, said Sumner Tainter made application in due form of law to the Commissioner of Patents, for the grant of Letters Patent of the United States for the said invention, and then and therefully complied in all respects with the requirements and provisions of the laws of the United States in such case made and provided.

That due proceedings upon said application being had, upon the 4th day of May, 1886, Letters Patent of the United

States, in due form of law were issued and delivered to said Sumner Tainter in the name of the United States under the seal of the Patent Office, signed and countersigned respectively by the proper officers of the United States, and numbered 341,288, granting to said Sumner Tainter, his heirs or assigns for the term of seventeen years from said 4th day of May, 1886, the full and exclusive right to make, use, and vend the said invention throughout the United States and the Territories thereof, as by reference to said Letters Patent or a duly authenticated copy thereof, hereunto annexed and made part thereof will more fully and at large appear.

That the inventions or improvements described and claimed in said patent of Sumner Tainter, were designed for and are capable of, use conjointly with the improvements or inventions described and claimed in the patent aforesaid of Bell and Tainter in recording and reproducing sounds.

And your orators further show that on the
day of 1888, said Chichester A. Bell and Sumner Tainter by an instrument in writing duly signed, delivered and recorded in the United States Patent Office the day of 1888, did give, grant, assign and convey to your orator, The Volta Graphophone Co., its successors and assigns, the entire right, title and interest in and to said Let-

ters Patent, No. 341,214, granted to them as aforesaid, and in and to the invention secured thereby, as by reference to said instrument or to a duly authenticated copy thereof hereunto annexed and made a part hereof, will more fully and at large appear.

That on the day of 188 , said Sumner Taintor, by an instrument in writing duly signed and delivered and recorded in the United States Patent Office the day of 188 , did give, grant, assign and convey to your orator, The Volta Graphophone Company, its successors and assigns, the entire right, title and interest in and to said Letters Patent No. 341,238, granted to him as aforesaid, and in and to the invention secured thereby, as by reference to said instrument, or a duly authenticated copy thereof, here in Court to be produced, if required, will more fully and at large appear.

And your orators further show that on the day of 188 , the said The Volta Graphophone Company, by an instrument in writing duly signed, and delivered, did grant to the said The American Graphophone Company, the exclusive right and license under the Letters Patent aforesaid, and each of them, to make use and vend Apparatus for Recording and Reproducing Speech and other Sounds, as by reference to said in-

strument, recorded in the Patent Office the day of
188 , or a duly authenticated copy thereof, here-
unto annexed and made part hereof, will more fully and at large
appear.

That your Orator, The Volta Graphophone Company, has
been since the date of the assignments aforesaid and is now the
owner of the said Letters Patent, and each of them, and of the
rights and privileges secured thereby, and have been and are,
save for the doings of these defendants, in the exclusive pos-
session of said rights and privileges; and that your Orator,
The American Graphophone Company, has been since the date of
the license aforesaid, and still is, entitled to the exclusive
use of the said inventions and improvements withⁱⁿ the limits
aforesaid.

And your Orators further show that the said inventions
and improvements are of great commercial value and practical
utility; that a great public interest has been manifested
therein, and a large demand created for apparatus constructed
in accordance with, or embodying the same; that in order to
supply this demand and to confer upon the public the advanta-
ges and benefits of the said inventions, your Orators have in-
vested large capital in acquiring said patents, and in adapt-
ing and perfecting such apparatus, and have at great expense

devised and constructed machinery, tools, appliances and other accessories necessary or useful in the manufacture of such apparatus, and have employed numerous skilled workmen, inventors and mechanics in connection therewith; and that such investment has been made and such expense incurred upon the faith reposed in the said Letters Patent granted by the Government of the United States as aforesaid, and in these rights and privileges secured to them thereby.

And your orators show, upon information and belief, that these defendants, and others acting in concert with them, since the grant of said Letters Patent and each of them, and since the date of the assignments and license aforesaid, within the said District of _____ and elsewhere in the United States, wrongfully, unlawfully, and with intent to injure your orators, and to deprive them of the just profits resulting from making, using and vending said inventions, have, without the license or consent of your orators, made, or caused to be made, used or caused to be used, and sold or caused to be sold apparatus for recording and reproducing sounds, known as "phonographs" or "graphophones", each and all containing or embodying, or operating in accordance with, the said inventions, or improvements, substantially as described and claimed in the said Letters Patent and each of them, and in infringement of the ex-

clusive rights granted to your orators as aforesaid; and that the said defendants have derived and received and are still deriving and receiving great gains and profits from such unlawful use, but to what extent your orators are ignorant, and cannot set forth;

That each such machine or apparatus so made, used, and sold by these defendants contains, embodies, or operates in accordance with, the inventions or improvements covered by both the Letters Patent aforesaid, or material and substantial parts thereof.

And your orators further show, upon information and belief, that these defendants have falsely stated and announced to the public that such infringing machines or apparatus, are constructed and operated in accordance with inventions made by and patented to said Thomas A. Edison, and have at numerous times and places since the assignments and licenses aforesaid, publicly exhibited such infringing machines as the inventions of said Thomas A. Edison, and have caused descriptions thereof to be published in many journals and periodicals, thereby deceiving the public and encouraging and inviting others to infringe your orators exclusive rights, to their great and irreparable injury.

And your orators further show, upon information and be-

lief, that these defendants, and others acting in concert with them, are about to construct a factory with machinery, tools, and appliances, for the purpose of making on a large scale, machines or apparatus containing, embodying, or operating in accordance with, the inventions covered by the Letters Patent aforesaid; designing thereby to further injure your orators; to interfere with the enjoyment of their rights and privileges and to deprive them of the profits to which they are justly entitled.

And your orators therefore pray that the said defendants may be compelled, by a decree of this Honorable Court, to account for and pay over unto your orators all such gains and profits as have accrued or arisen, or been earned or received by the said defendants, and all such gains and profits as would have accrued to your orators but for the unlawful doings of these defendants, and all damages your orators have sustained thereby; and that the defendants, their associates, attorneys, servants, clerks, agents and workmen, may be perpetually enjoined and restrained, by a writ of injunction issuing out of and under the seal of this honorable Court, from directly or indirectly making, or causing to be made, using or causing to be used, selling or causing to be sold and machine or apparatus embodying, or constructed or operating in accordance with, the

inventions or improvements set forth in the Letters Patent aforesaid, or either of them;

And that your Honors will grant unto your orators a preliminary injunction, issuing out of and under the seal of this honorable Court, enjoining and restraining the said defendants their associates, attorneys, servants, clerks, agents, and workmen, to the same purport, tenor and effect, as hereinbefore prayed for, with regard to said perpetual injunction;

And that the defendant be decreed to pay the costs of this suit;

And that your orators may have such other and further relief as the equity of the case may require.

To the end, therefore, that the said defendants may, if they can, show why your orators should not have the relief hereby prayed, and may full, true and direct answer make according to the best and utmost of their, and each of their, knowledge, information, remembrance, and belief, to the several matters hereinbefore averred and set forth, as fully and particularly as if the same were repeated, paragraph by paragraph, and they were thereto severally and specifically interrogated, may it please your Honors to grant to your orators a writ of subpoena ad respondendum growing out of, and under the seal of this honorable Court, directed to said defendants, commanding

them and each of them to appear and make answer to this Bill of Complaint; and to perform and abide by such orders and decree herein as to this Court may seem just,

And your orators will ever pray,

-----oOo-----

P. M., Exhibit No. 2.

CHARLES SUMNER TAINTER'S AFFIDAVIT.

DISTRICT OF COLUMBIA, ss:

Dated
June 18, 1888
See Pg. 73.

CHARLES SUMNER TAINTER, being duly sworn, deposes and says:-

I am a citizen of the United States and resident of Washington, D.C., having made this city my residence since 1879. Am now 34 years of age. *Thereby Born about 1854*

I have been an electrician and mechanical engineer for the past 15 years. I was at one time in the employ of Charles Williams Jr., of Boston, Mass., maker of telegraphic and electrical apparatus; and was afterwards employed a number of years by Alvan Clark & Sons on astronomical and other optical instruments.

In 1874 I was commissioned by the U.S. Government to accompany the expedition to observe the transit of Venus, and on

that mission visited the observing stations of the southern hemisphere, having special charge and care of the instruments and their mounting, etc.

Prior to 1879, for about 18 months, I was in business for myself as philosophical instrument maker.

In 1879 I was associated with Alexander Graham Bell and assisted him in the development of radiophonic instruments. Before coming to Washington, however, perhaps a month or two before that time, I had conversations with Mr. Bell in Cambridge Mass., on the subject of the phonograph, and found a singular coincidence in our views upon this art; both agreeing that the art of recording and reproducing sounds was then in its infancy, and that it had a great future of practical utility if developed in the right direction; but that its development would involve protracted experiment, labor and research, and the assistance of considerable capital. We understood from a reliable source that Mr. Edison, the inventor and patentee of the phonograph, discouraged by the obstacles encountered, and the evident remoteness of success, had dropped the subject, and was devoting himself to other matters.

During my employment in Washington at Mr. Bell's Laboratory upon Radiophonic experiments, the phonograph was the subject of frequent discussion, and it was determined that, as soon

as the experiments we were then conducting were sufficiently advanced, the matter of recording and reproducing sounds should be taken up for serious and methodical study.

My previous education, studies, and professional pursuits had familiarized me with the general laws and phenomena of acoustics, and with the action of various media when influenced by sonorous and other vibrations; and I believed that, by study, experiment and invention, with the aid of proper facilities it would be possible to overcome the difficulties that had theretofore proved insurmountable.

In the spring of 1881, the radiophonic inventions having reached such a stage of development as no longer to require exclusive attention, a special arrangement was made by Mr. A. G. Bell, Dr. Chichester A. Bell, (chemist and electrician) and myself, resulting in the formation of an association, known as the Volta Laboratory Association, whose object was the study and elaboration of ideas, inventions and discoveries relating to the art of transmitting, recording and reproducing sounds, and experimenting with the same for our mutual benefit..

In pursuant of our object a Laboratory was fitted up at 1221 (now 1215) Connecticut Avenue in this city, and was equipped with power, machinery, and all necessary apparatus and appliances for carrying on investigations and scientific experiments.

We kept a systematic record in which the associates entered both individually and collectively their experiences, discoveries and suggestions, and in which were also kept memoranda of the results of the experiments that were continuously carried on. The work was continued with great assiduity for a period of four years, when, namely on May 1, 1885, the association was dissolved by common consent.

During this time a number of valuable inventions and discoveries had been worked out and perfected, and some of these are described among others in patents Nos. 341,212,--341,213,--341,214,--341,287,--341,288,--all dated May 4, 1886, and subsequently assigned to the Volta Graphophone Company.

It would be an impossibility, without referring to the 15 volumes which contain my own personal notes, and which constitute only a fraction of the entire record, to give an adequate idea of the innumerable experiments made, and apparatus constructed and tested during the period indicated. In a word it would require volumes to detail the history of the development of the instrument now known as the "graphophone", which is the principal outcome of our long labors.

I will, however, briefly outline the course of the studies pursued. But it will be well to explain first the state of the art at that time in order that our precise point of depart-

ure may be understood.

The first apparatus for producing a graphic representation of sound was made in the year 1857, when one Leon Scott devised what he terms the "phonautograph", which consisted of a recording cylinder, coated with a thin film of lamp black, revolving spirally against a stylus the latter being carried and actuated by a diaphragm, against which the operator spoke or sung. The vibrations imparted to the diaphragm, which was arranged at right angles to the axis of the cylinder, being communicated to the stylus, caused a wavy line to be traced by the latter in the film of lamp black, the undulations of this line corresponding precisely with the sound vibrations. Scott thus produced a graphic record of sound, but devised no means for reproducing the sound.

Mr. Bell by his invention in 1875-76 of the speaking telephone demonstrated that sound of every sort could be reproduced by causing a diaphragm to vibrate in correspondence with the atmospheric vibrations characteristic of such sounds; in other words by causing it to copy the motions of the diaphragm when spoken to or thrown into vibrations by any sound producing agency. In the Bell receiving telephone the diaphragm was caused to copy the motions of the transmitting diaphragm by electrical agency. It only remained, therefore, to devise a

mechanical expedient for communicating the motions of the recording diaphragm of a Scott phonautograph to a diaphragm similar to that of a Bell receiver.

This Mr. Edison did, in the year 1877, by means of the instrument known as the phonograph, in which the sound record or undulatory line on a cylinder produced in accordance with Scott's invention was utilized as a groove or cam which guided a stylus attached at one end to a diaphragm, which was thereby vibrated in accordance with the irregularity in the bottom of the groove.

The grooved sound record in the Edison phonograph was produced by moving a very soft and pliable material, such as metal foil, against the point of the recording stylus, while speaking or making a noise in front of the diaphragm, to which it was attached, so that the point of such stylus indented a line having alternate elevations and depressions in such soft pliable strip.

The close relation existing between the telephone and the phonograph is fully recognized by those conversant with the subject. As editorially stated in a leading electrical journal (Electrical Review, May 19, 1888) "the principles of operation of the phonograph are closely allied to, if not identical with those of the telephone".

The instrument constructed by Edison was crude , but it served to demonstrate that sounds of every kind could be reproduced mechanically.

In actual performance the apparatus was very unsatisfactory. The sounds reproduced were metallic and indistinct, and bore but a faint resemblance to their originals. They were at best distorted and characatured. Recognizable speech could not be obtained. The instrument served only as a toy for amusement, being incapable of practical use; and after a tour of exhibition it was laid aside and dropped entirely out of public notice.

Mr. Edison labored on this device for several years, his last U. S. patent being granted in May 1880, and although the greatest public interest was manifested, and glowing predictions made of the results that would be accomplished, these were never fulfilled by Mr. Edison.

We began our work in this direction by studying the causes of failure in the phonograph. We saw that its construction was not in the first place adapted to produce in the metal foil an exact record of the sonorous vibrations; since , owing to the pliability of the material the action of the stylus while forming the record, has a tendency to alter and distort the portion immediately back of the point of action. Another

cause of inaccuracy was due to the action of the reproducing diaphragm, which, while acted upon positively by the stylus in one direction, that is when the latter was raised by an elevation in the record, had to react by its elasticity in the other. Furthermore, it was very evident that an instrument forming a record in a pliable strip could never be practically successful, since the record was essentially perishable, the utmost care was necessary in handling it to prevent injury, and every attempt at reproduction tended to smooth out and obliterate the sound record.

It became evident, therefore, at the outset that the method of indenting a pliable strip whether of tin foil or of paper saturated with wax or similar composition, involved elements of failure that could not be eliminated; that it would be useless to attempt improving the phonographs and that an entirely different mode of recording, in a substance not possessing the detrimental properties of the pliable strip or sheet must be discovered. We immediately addressed ourselves to that discovery and its practical embodiment.

From the experience had with a pliable strip we soon determined that the record to be permanent must be produced in a plate of solid, resisting material. Another object in view at this time was the utilization of such plate as a die or mold for

producing duplicates of the sound record. The difficulties that presented themselves at the outset were many and serious. Experiments had first to be made to discover what material was suited to this purpose, and then to determine by what method a sound record could be accurately, and with the required ease and rapidity, produced therein. The study and examination of different substances for the recording medium took a wide range and occupied many months. The field was large and comparatively unexplored for this purpose, and our search was therefore a laborious one. It would be difficult to enumerate the different substances that came under our examination. They included woods metals, alloys, hard rubber, and compositions of various sorts.

Among the new methods proposed by us for forming the undulatory record, that regarded with most favor was to engrave the record directly in the solid material by a cutting style adapted to grave or gouge out the material acted upon, thus forming a groove, the bottom of which presented irregularities constituting the sound record.

In all these experiments the resistance to the action of the stylus in cutting was carefully noted and recorded, and in most cases found to be too great to admit of use.

Our first experiments were directed to the production of a zig-zag record, as in the phonautograph, as we hoped in

reproducing to get better results from such a record, as the motions of the reproducing style were thereby controlled positively in both directions. In the same line we made numerous experiments with the analogous art of etching the record in a metal plate. In these experiments a hard and smooth metal plate such as hardened steel was flowed over with a film of melted wax, which when cooled constituted a coating of hard, yet easily cut or engraved substance. The stylus, actuated by the diaphragm traced its wavy or sinuous line in the wax ground, exposing the metal of the plate. The latter was then immersed in a bath of acid to eat into the metal where thus exposed. The wax being then removed, a metal tablet remained having a zig-zag, or wavy groove etched in it.

We also formed records in metal by the electric etching process, with which some fairly good results were obtained, the action being much more regular and energetic than in the chemical process.

This plan did not give entire satisfaction. The reproduced sounds were harsh and grating. Microscopic examination led to the discovery of the causes of these disturbances. It was found that the acid eating into the metal left a ragged surface against which the reproducing stylus grated; and that the acid moreover ate under the surface of the wax, forming a groove

of irregular width.

In this connection we also tried to form an undulating ridge, instead of a groove, in a somewhat similar manner. The tablet was prepared as before with a wax coating and engraved by the recording style, and then placed in an electroplating bath, wherein metal was deposited in the groove cut upon the surface of the tablet. The tablet being of copper, or other non-magnetic metal, and the deposited metal iron, the record so formed was used for reproduction by a magnetic stylus.

The obstacles to absolute success in this direction were these (1) to insure the entire removal of the wax film considerable pressure had to be put upon the recording style, which caused such resistance to the latter as to prevent its following accurately the minute sound vibrations; (2) on the other hand if the wax were not entirely removed the etching fluid could not act perfectly, and this constituted a serious source of error; (3) in building up the deposited metal it exhibited a tendency to spread over the edges of the groove, instead of accurately following it. On these accounts it was not deemed expedient to press our investigations in this direction. These experiments, however, showed us the feasibility of engraving a record in wax, which led to the successful development of the instrument now known as the "graphophone".

Another method of the same character, devised by us, consisted in etching a record in a long flat ribbon of steel (such as a watch spring). Another ribbon of soft iron was laid upon this and both fed together between compression rolls whereby the softer metal was squeezed into the etched groove, and a record in relief obtained. Any number of similar records could be made in this manner from the etched steel ribbon; and used in connection with a magnetic reproducing arrangement. In view of the difficulties encountered in this process, however, we made no attempt to put it to actual commercial success; preferring to devote our labors to simpler and more promising methods.

I will not attempt to outline further the different directions in which our investigations were pushed, or the extent of the field investigated. The scope of the work was very broad, and the discoveries numerous and important. Some of these are described in the patents of May 4, 1886, above referred to, and others, not so fully developed were recorded in our books for further study and experiment. We were most anxious to push our work to the perfection of an apparatus capable of actual commercial use, and to this end we singled out for special effort and detailed investigation, the plan that promised the most immediate success.

Our experiments with engraving in wax determined that such substance gave but very slight resistance to the action of a properly constructed cutting style, and did not to a serious extent interfere with the motions imparted to it by the diaphragm; and we were assured that success lay in this direction. One of the chief difficulties, however, resided in the wax itself. Some wax which would cut smoothly and evenly at low temperatures would be soft and sticky at higher temperatures.

Beeswax was first experimented with; but this was found to be so soft as to adhere to a pernicious extent to the point of the graving tool, and too susceptible to changes of temperature. We therefore conceived the idea of overcoming these difficulties by adding some hardening substances. Among those first suggested for the purpose paraffine was found most suitable; and thereupon a series of careful experiments was conducted to ascertain the proper proportions of the two substances. As the result we determined that the best mixture obtainable from these materials consisted of about one part by weight of beeswax to two parts of paraffine the proportions depending upon the hardness of the paraffine. Then experiments were made with different substances to serve as the base or foundation for the wax surface. Stiff paper or cardboard was found to answer well for the purpose, and tablets made on that plan were

used extensively in our experiments and justified all our expectations.

One of the main difficulties with the original phonograph was its indistinctness of articulation. While giving a loud sound it was utterly impossible to reproduce intelligible speech, and for that reason in exhibiting the instrument experiments were confined to recording familiar nursery rhymes and songs, which the ear could recognize from the rhythm.

We found, in the course of our experiments, that while records cut in wax were much more perfect than those indented in metal foil, greater distinctness could also be gained by reducing the size of the record and concentrating the sound by hearing tubes in the listener's ear. Thus a double advantage was gained; for besides the vastly improved articulation, privacy in the use of the instruments was insured. A number of instruments could utter their distinct messages in each listener's ear without mutual disturbance; and the overhearing of private communications was prevented.

Considerable study was also given to the construction of the engraving tool or stylus, this being a detail of much importance. We finally adopted the form of style shown and described in patent No. 341,214, which cut a groove with sloping walls. Other and improved forms of gravers or cutting styles

have subsequently been devised.

One advantage of great practical value in our apparatus may here be pointed out. In reproducing from an indented strip of tin-foil or other material, the utmost care had to be exercised in guiding the point of the style in the line of the groove, as any divergence therefrom would, of course, interrupt the reproduction. By the use of a record cut in solid material, as wax, and particularly if the groove have sloping walls, this difficulty is entirely eliminated, and the point of the reproducing style keeps its place in the groove without the exercise of any care. The sloping sides of the groove insure that the point of the style will rest always in the bottom thereof, in contact with the sound record. The certainty of this operation is further insured by loosely mounting the reproducing style, so that its own weight would keep it in contact with the record, and by making it capable of yielding laterally.

The construction of the reproducer was also the subject of considerable study and experiment, and in connection with it means were devised for insuring the quick return of the style, so that after passing an elevation in the record it would descend fully into the succeeding depression. By such means the tendency of the style to skip from the crest of one elevation to the next resulting in the production of unintelligible sounds, as

before stated, was counteracted.

By this method of graving out a record in a solid waxy composition the difficulties and defects inherent in the plan of indenting a pliable strip were completely overcome. Articulate speech was reproduced distinctly, accurately and with purity of enunciation, and the record formed in the stiff tablet could be handled and transported through the mails without damage, and could be used for reproduction many hundred times without deterioration.

This method and the apparatus essential for practising the same were the inventions of Dr. C. A. Bell and myself, and patent No. 341,214, granted to us May 4, 1886, gives a full description of the method of cutting a record in a solid body, such as wax, the cutting or graving style of a sound recorded, the sound record consisting of a solid body having the sound record cut therein, as well as the specific composition of paraffine and beeswax, and many details of mechanism and devices adapted for use in carrying out this invention.

I made it my individual work to elaborate the details of a machine embodying these principles and the results achieved are set forth in patent No. 341,288, granted to me May 4, 1886. I found that a tablet, cylindrical in form, could be advantageously substituted for the flat or disk-shaped form; and

I obtained a cheap and easily made tablet by coating a paper tube with a composition of beeswax and paraffine. This tablet is self supporting, it has no tendency to lose its shape by warping or otherwise, and in use it is convenient and efficient. The recorder for operating in connection with it was provided with a cutting style, and was arranged to be fed forward slowly while the cylindrical tablet was rotated, thus gravng a spiral line on its surface. The recorder was arranged to rest by its own weight on the tablet, and thus its action was not detrimentally affected by inequalities in the surface thereof. Several machines were constructed as described in this patent and operated with excellent results. A description of it is published in Harper's Weekly, July 17, 1886. Its performance satisfied us that a machine capable of industrial use was obtained, and we began then to consider plans for introducing it to the public.

*He probably means the Edison Speaking
Phonograph Company as The Edison
Phono Co. was not organized then.*

Knowing of the existence of the Edison Phonograph Co.,
organized to manufacture and sell the phonograph, and which controlled the patents of Mr. Edison and the rights secured thereby we concluded to bring an apparatus to the notice of Mr. Edison, and those interested with him.

Accordingly in July 1885, Mr. Edward M. Johnson, at our invitation visited the Volta Laboratory in this city to ex-

examine the machine. Mr. Johnson had been identified with Mr. Edison in his work on the phonograph as his collaborateur; had publicly exhibited and explained it, and was, moreover, largely interested in the Phonograph Company. Opportunity was then given him to examine the machine and test its capabilities.

As the result of this examination, a further and fuller test was invited, and in the following month we carried a machine to New York, and exhibited it to Mr. Johnson, and others interested in the Phonograph Co., our object being to make such arrangement with that Company as would lead to the commercial working of the invention for our mutual benefit.

Mr. Johnson devoted considerable time to examining and testing the apparatus, and while conceding that it was promising professed reluctance to conclude any negotiations until entirely satisfied that the method of engraving in wax and like material was practical for ordinary commercial purposes. Mr. Johnson's attitude of course, was that of one invited to invest in a new invention, and interested to make the most advantageous terms for himself. At his suggestion, and with a view to removing all doubt from his mind, the machine was taken to the factory of Bergmann & Co., in New York, to have several machines made as a demonstration of their practicability. While at that factory, in which Mr. Edison himself had an interest, a large

Edison phonograph was produced and tested in comparison with our instrument in the presence of several persons.

I spent about two months in New York supervising work on several machines, which were in course of construction at that shop. During this period Mr. Johnson was frequently present and Mr. Edison himself, who occupied the floor above as a laboratory, was in the shop several times.

One of the machines was pushed to early completion and exhibited to Mr. Johnson, who declared himself to be better satisfied. I may say that he subsequently manifested his appreciation of our inventions by making a proposition looking to a combination of interests, but the terms offered were not such as to warrant its acceptance on our part.

Nothing having come of those negotiations, The Volta Graphophone Co., was organized in January, 1886, and acquired by purchase the several patents and inventions on this subject of A. G. Bell, C. A. Bell and myself.

At this time, viz., January 1886, the Volta Laboratory being no longer available, I ceased work there, and on February 1, 1886 fitted up another laboratory in this city (2020 F. St. N.W.) where I pursued my work until November 1887, when requiring larger quarters and greater facilities the old Volta Laboratory building was again fitted up with machinery and all neces-

sary appliances and a large corps of mechanics, draftsmen and workmen were employed to prosecute the work, which has continued and is now being carried on, in this building.

My efforts during this period were devoted to the general improvement of the apparatus and its details, to insure greater simplicity, convenience in use, and distinctness of articulation. Many improvements in various parts, such as the recorder, the reproducer, the tablet-holder, regulator, motor, etc., were made, which contributed greatly to these ends.

A great deal of time and special effort has also been devoted to the improvement of the tablet or recording cylinder. I have examined for this purpose all the waxes and kindred substances that promised favorable results, and have experimented with various compositions or mixtures of different kinds of waxes. The properties of all such with reference to their action upon the recording and reproducing styles, the extent to which they were affected by changes of temperature and the chemical changes to which they were liable by exposure and lapse of time, etc., were carefully noted.

As the result of these experiments several compositions have been produced which give better results than the mixture of beeswax and paraffine.

I have also been engaged in devising machinery for the

rapid and economical manufacture of these tablets; and the inventions made in this line are of great value, enabling the tablets to be produced cheaply and in large quantities, and thus to be sold to the public at small cost.

These various improvements and others which I will not specifically mention are described in U.S. patents granted to me and in pending applications for patents.

The last attempt at concluding negotiations with the Edison Phonograph Co., was about May 1, 1887, when an appointment was made to exhibit the graphophone to Mr. Edison in person. At that time I went to New York in company with other gentlemen interested with me, taking a machine substantially like that exhibited to Mr. Johnson in 1885, and also a model of a machine of new design.

On arriving in New York we found that Mr. Edison, who had just returned from Florida, was confined to his house by illness, and we were therefore unable to exhibit it to him. A very satisfactory exhibition was however, made in the presence of Mr. Johnson, and others, all of whom expressed interest and satisfaction with the results obtained.

Since the completion of machines capable of practical use, preparations for their manufacture upon a commercial scale have been made as rapidly as possible. Difficulty has been en-

countered in this on account of the delicacy of some of the parts, requiring very nice workmanship and machinery and tools of special sorts--facilities that few, if any, workshop in the country possess to the extent requisite to enable them to turn out machines fast enough to supply the demand. The machines made have been eagerly taken, and the demand that exists at present, without any special effort to advertise the apparatus, is far in excess of our ability to manufacture. On this account we have concluded to establish our own factory; and preparations looking to that end are now on foot. In the meantime the machines are being made by the Western Electric Co., of New York

A number of machines are and have been for several months in constant use in this city, and have been found to perform their work with accuracy under the severest tests. Many of these machines are employed by stenographers, who rapidly dictate to them their shorthand notes and then turn the tablets over to typewriters, who transcribe the matter directly therefrom, thus saving a large portion of the reporter's time hitherto necessarily employed in writing out his notes or dictating to an amanuensis, and dispensing entirely with the services of stenographers as amanuensis. - The accuracy with which this work is performed demonstrates the efficiency of the instrument as a recorder and reproducer of articulate speech, and its perfect

reliability as a substitute for manual writing in correspondence dictation, etc.

For some time past the reports of the proceedings of both houses of Congress, where the most accurate work is required, have been transcribed in this manner.

It would be difficult to state even approximately the aggregate cost of developing this apparatus to the point of practical utility. The rental, and equipment of the laboratory, the labor and materials for experiment, involved a very large outlay. In addition to this must be included the work of the associates during a period of four years, and my own labors for the three additional years since the dissolution of the association.

For all of this outlay, which cannot be estimated at less than Fifty Thousand Dollars, we look for compensation in the returns from the commercial working of the invention, and any interference with our business enterprise would cause irreparable injury.

The expenses incidental to obtaining patents on our inventions in this and other countries and in maintaining the same have also been very heavy.

Upon the organization of the Volta Graphophone Company and the American Graphophone Co., its licensee, two hundred and

twenty-five thousand dollars were invested by the organizers of the Companies upon the faith of these patents, and until the recent attempts at interference with our business the stock commanded a large premium.

And finally, in order that the public may be supplied with graphophones properly made, we are about to incur great expense in fitting up a proper factory, which cannot be done for less than one hundred thousand dollars.

From this it will be seen that the effort to develop the art of recording and reproducing speech, and to bring a perfected machine to the service of the public who are eagerly awaiting it, has only been accomplished by the most incessant and protracted labors and the expenditures of enormous sums of money incurred in the belief and expectation that the rights of the inventors and patentees would be respected and enforced.

Although we have fully exhibited the graphophone, particularly to Mr. Edison's associates since 1885, and although our patents were issued and published in May 1886, no question as to our rights under such patents was raised until the Fall of 1887, when Mr. Edison by systematic and well directed efforts began to call public attention to what was termed the improved phonograph, which he was then said to be perfecting. Although much was said in print regarding this improved phonograph, its use

and advantages, no article that I have seen described the principle of its operation, and no public exhibition of it was made, so far as I have been able to ascertain, until about the month of May, 1888.

A description of a public exhibition of the phonograph had on May 12, 1888 in New York City was published in the Electrical World of May 19, 1888 and in many other illustrated periodicals, as well as in the daily press. From these it appeared that the "improved phonograph" is a servile copy of the graphophone in the following respects:- It employed a cutting or graving style; its record was engarved in a solid material and not indented in a pliable strip; the recording surface was a composition of wax; the tablet itself was a self-sustaining tube or cylinder, the sounds were concentrated in the ears by ear-pieces, and in other material respects, the instrument embodied inventions covered by the patents aforesaid. The said instruments were exhibited as the inventions of Mr. Edison, and it was falsely announced that its essentials were all contained in the patents taken out by said Edison in 1878.

I have read those patents, and have long been familiar with their contents and I state of my own knowledge that in the particulars above enumerated, and in other respects, the said apparatus is constructed in accordance with the Graphophone pat-

ents, and that none of the said features are described in any prior patent of Mr. Edison.

Principal reference was had in published article to the content a British patent taken out by Edison, No. 1644 of 1876, with the contents of which I am familiar. That patent does not contain any of the features included in patents Nos. 341,214, and 341,268 above mentioned and now used by Edison in the "improved phonograph".

The systematic and extensive advertisements and notices regarding the phonograph, the exhibitions given and announced, and the circulation of the false claims set up by said Edison to the inventions aforesaid have done great mischief, and seriously affected our business, in misleading the public and those who would be purchasers of our machines, but for the unlawful interference with our rights and appropriation of the valuable results of our long labors and costly experiments, above referred to.

Sworn to and subscribed be-

fore me this 18th day of June, 1888. :

: CHARLES SUMNER TAINTER,

Philip Mauro,
Notary Public,
(SEAL) D.C.

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P. M. EXHIBIT NO. 3.

AFFIDAVIT of EMILE BERLINER.

DISTRICT OF COLUMBIA, ss:

*Dated June 21, 1888
(Sec Pg. 84)*

EMILE BERLINER, being duly sworn deposes and says:

I am 37 years of age and am a citizen of the United States and a resident of Washington, D. C. I am an electrician and inventor.

Soon after the invention of the telephone by Mr. A.G. Bell, I became interested in the development of that art, and began work in the direction of improving the construction of electric speaking telephones.

I invented what is known as the variable contact transmitter, of which the commercial Blake transmitter is a type. From that time to the present I have devoted myself to the study of the laws of sound and the phenomena attending its production, transmission, and reproduction, in inventing and discovering improvements in apparatus for transmitting sounds, in electrical and other experiments connected with this subject; and in such like scientific pursuits.

I have long been familiar with the construction and operation of the phonograph, patented by Thos. A. Edison in the U. S. and in other countries in 1878. I have read his U.S. and

British patents of that year, as well as many publications appearing in periodicals and scientific works of 1877, 1878 and subsequent years, giving descriptions of the phonograph, as then constructed, and containing also many suggestions of modifications, and various possible and impossible applications and uses of the apparatus.

I am also familiar with the construction and operation of the so-called graphophone, as made and exhibited, and as described in letters-patent No. 341,214 and 341,268, of May 4, 1886 the former to Chichester A. Bell and Sumner Tainter, and the latter to S. Tainter.

Since the exhibition of the Edison phonograph in 1878 no advance of any consequence has been made in the art of recording and reproducing sounds. The subject had apparently dropped out of the notice of scientific men and of the public generally, the phonograph having failed to realize the expectations which it created.

The issue of the patents of Bell and Tainter, however, and the methods and apparatus which they described, gave a new impetus to the art, and amply demonstrated that the problem of recording and reproducing sounds, with sufficient accuracy and certainty to subserve actual commercial needs, had been solved.

Seeing the possibility of still further important discoveries and inventions in this line and having previously given some time to the subject, I began, in the year 1887, to devote myself seriously to it; and from that time to the present have been almost continuously engaged in experiment, research and investigation in matters connected with this art. I have, during that time made a thorough investigation of the prior state of the art, and believe that I have examined substantially everything contained in patents, scientific journals, and other publications connected with this subject. I have devoted a great deal of time to this work.

In the Electrical World (N. Y.) for November 12, 1887 in giving a description of an apparatus invented by me and called the "gramophone", I described some of the things previously done and attempted, and referred to a paper prepared by one Charles Cros, in the spring of 1877, which my investigations had brought to light, and which contains the earliest description of any method of reproducing sounds from a record.

In May 1888 I read a paper prepared by me upon this subject before the Franklin Institute, and published in the Journal of that Institute for June 1888. In that paper I give a detailed description of the origin and development of this art.

I will here briefly describe the leading events in that history.

In 1854, Charles Bourseuil, with more than usual boldness advanced the idea that two diaphragms, one operating an electric contact, and the other under the influence of an electro-magnet, might be employed for transmitting speech over telegraphic distances. "Speak against one diaphragm", he said, "and let each vibration break or make the electric contact, and the electric pulsations thereby produced will set the other diaphragm vibrating, and the latter ought then to reproduce the transmitted sound". Outside of the fallacy which his theory contained in the assumption of breaking the contact, instead of merely modifying the same, Bourseuil's paper, in speaking of the diaphragm, laid stress upon the importance of producing one so mobile and flexible as to answer to all the undulations of sound. He evidently desired extreme flexibility, and diaphragms constructed on that principle proved fatal to the efforts of many subsequent experimenters; even at first to Mr. Bell.

Bourseuil's ideas were taken up by Philip Reis of Frankfort, Germany, resulting in the well known Reis telephone.

While Bourseuil's conception was being digested by Reis, another invention, having also a membrane diaphragm as

its motive principle, was patented in France in 1857. This was the phonautograph, by Leon Scott, which had for its purpose the recording of sound vibrations upon a cylinder rotated by hand and moved forward by a screw. The cylinder was covered with paper, this was smoked over a flame, and a stylus attached to the center of a diaphragm under the influence of words spoken into a large barrel-like mouth-piece, would trace sound vibrations upon the smoky surface. Scott also employed an animal membrane for his diaphragm, and took pains, by means of an attachment called a sub-divider, to make the vibrations appear as large as possible. This sub-divider, however, became the prototype of the dampers in subsequent apparatus, like the Blake transmitter and the Edison phonograph.

The next important event in electro-phonie and acoustic science was the publication by Helmholtz of his investigations in sound, and of Konig in the same line of research, but classical as these publications will forever remain, they for a time retarded the progress of apparatus for practical use, for the reason that they discouraged inventors by the mechanical complications which they apparently ascribed as indispensable to articulate speech. In fact, the perusal of their work left a serious doubt in the mind of many a student, whether there was not something in articulate speech and its audibility by the human ear, beyond the grasp of the mechanical mind of man.

These doubts were still increased by the attempts of Faber to construct a talking machine, after the system of the human organs of speech, a mass of intricate mechanism, levers, bellows, and pulleys, which gave an unearthly rendition of many words and sentences.

But the Bell telephone came, and its greatness consisted not so much in the fact that it carried speech over hundreds of miles, but that it taught how simple a piece of apparatus could produce such perfect results, and that any diaphragm however thick, could be made to set up audible articulate vibrations.

The effect of this lesson was immediate; for on April 30, 1877, Mr. Charles Cros, deposited with the Secretary of the Academy of Sciences in Paris a sealed envelope, containing a description of a method of reproducing sounds from a Scott phonautogram. A translation of the entire paper is given in my article in the Journal of the Franklin Institute, above referred to. In brief the proposed plan consisted in converting the undulatory spiral line of a Scott phonautogram into a line of similar form, in relief or intaglio, in a resisting medium by utilizing the photo-engraving process.

This paper was read in open session at the Academy on December 3, 1877, and in the meantime Mr. T. A. Edison appeared

with the phonograph.

Everybody remembers the sensation which the invention produced, and the prognostications which were advanced for it by the scientific press showed that the principle of the apparatus was considered to contain the germ of an ultimate achievement of the most accurate results.

In this respect, as well as in others, there are striking resemblances in the history of the two inventions with which I am dealing.

In both, the original idea emanated from Frenchmen, and both described one process of transmitting, and a different process of reproducing speech. In the Bourseuil telephone there was a contact transmitter and an electro-magnet receiver; in the Cros phonograph, a written record and an engraved reproducing groove.

In both inventions the first realization occurred in the United States, and was effected with apparatus representing only the reproducer of the original conception. In the speaking telephone, the reproducing electro-magnet of Bourseuil became also the transmitter of Bell, and in the phonograph, the reproducing groove and stylus of Cros became also the recorder of Edison. Both the Bell and Edison apparatus were accepted for a time as containing the best mechanical and philosophical

principle for the highest attainable results. In both, the aim at the beginning was to produce loud sounds, and both eventually contented themselves with a much fainter voice, which then became more distinct in articulation.

The paper of Mr. Cros can be found on page 1032, vol. 85, of the Comptes Rendus of 1877.

The method of producing the record adopted by Mr. Edison differed from that of Scott and Cros in that he used a soft pliable sheet of strip, which was indented or depressed by the stylus at right angles to the surface of such sheet or strip. From the patents and publications relating to the phonograph, it is apparent that in 1877 and 1878 Mr. Edison experimented with many materials for receiving the dents or impressions. One of the earliest published descriptions is that contained in the Scientific American of November 17, 1877, which described the use of a paper strip having a V-shaped ridge in the summit of which the indentations were formed. Other publications and patents, notably British patent No. 1644 of 1878, suggest paper saturated with paraffine, and other substances; but all the publications descriptive of the instrument as made and exhibited show that thin metal foil was settled upon as the material most suitable for receiving the indentations of the style.

There are many defects inherent in the construction and mode of operation of the phonograph, which effectually exclude the possibility of its use for commercial purposes. It is well known that the phonograph was used for exhibition purposes only, and that its uncouth utterances scarcely bore a resemblance to articulate speech.

The method employed in the graphophone is calculated to overcome the chief defects of the phonograph. That method consists in engraving or cutting out the record in a solid resisting medium, instead of indenting it in a pliable substance. The principles of the two methods are radically different, as are their respective results, and in the graphophone the public have the first really practical apparatus for recording and reproducing sounds. As the result of the graphophonic method we have a record, which is not only sufficiently accurate to insure intelligible reproduction, but is made in a material which is comparatively hard, and therefore suitable for reproduction, and for handling and transportation - a consideration of great practical importance.

Between the phonograph and the graphophone, apart from many important differences of detail, I recognize three fundamental distinctions.

First, in the recording instrument, which in the one

case is an indenting point, and in the other a cutting or graving tool;

Second, in the method of forming a record, which in the one case is accomplished by denting or bending a pliable substance by contact with the surface thereof, and in the other by cutting or engraving with a graver or cutting tool, whose point is constantly embedded in the hard material (such as wax) of which the surface of the recording tablet is composed; and

Third, in the record itself, which in the one case is a soft pliable strip, the faint indentations of which are easily obliterated, and in the other a hard resisting tube or disk having grooves cut or engraved in its surface.

The graphophonic method and apparatus were first made public by the issue of the letters-patent above referred to on May 4, 1886, and the method and apparatus disclosed in said patents were at the time entire novelties to the public and to scientific men. My familiarity with the history of this art, and with what had previously been done and written, enables me to say with confidence that the method of forming a record by engraving in solid materials in general, and waxy compositions in particular, the use of a graving style, the production of a record consisting of a solid body cut or engraved with narrow grooves of varied form corresponding to sound waves, and other

features of the graphophone as set forth and claimed in the above patents were not known prior to the invention thereof by the patentees, and are not described, shown or suggested in any patent or publication prior to the date of said patents.

The novelty of the method and apparatus, and the importance, of the results attained are evidenced by the great interest which was immediately awakened thereby, the issue of these patents having proved a new starting point in the development of the art. Since their issue scientific publications and the public press have been filled with discussions of apparatus and means for recording sounds, and of the vast possibilities of the art, and the attention of inventors and men of science has been drawn to the study of the conditions and means necessary to the realization of the prognostications that are made.

In conclusion I would state that I have no interest direct or indirect in the graphophone patents, and am in no way associated or connected with the proprietors thereof; my investigations, work, experiment, and invention in this line having been entirely independent, and in a different direction.

(Signed) EMILE BERLINER.

Subscribed and sworn to before me this 21st day of June,
1883.
(SEAL)

Philip Mauro,
Notary Public.

P. M. EXHIBIT NO. 4.

Henry Gustave Rogers being sworn deposes and says:

I am 31 years of age and reside in Washington, D. C.
My present occupation is that of Solicitor of Patents.

I have been engaged in laboratory work at different times during my life, and have turned my attention mostly to chemistry in relation to light and experimenting in applied mechanics.

In the latter part of 1883 or the commencement of 1884, I entered the Volta Association Laboratory and worked there until the fall of 1885. I took charge of the experiments connected with photo-phonography, and made many experiments with electric transmission of sound, and in recording and reproducing sonorous vibrations. I also experimented in the making of wax cylinders and wax disks, and in recording vibrations thereon. I thus fully acquainted myself with practical phonography, and am familiar with the construction of the recorder and the details of mechanism used in the graphophone, and in the Edison phonograph of 1877, and understand the difference in the principles on which the said Edison phonograph of 1877 and the graphophone work.

The engraving method of the graphophone, by means of a stylus having a cutting point or edge, and the indenting meth-

ed of the phonograph are clearly defined in my mind as two thoroughly different operations; differing not only because the stylus of the one must possess a cutting point or edge, and the stylus of the other must be rounded or blunt, but because it would seem impossible to interchange the two, and use the foil with the cutting stylus, and the wax with the blunt or rounded stylus and yet obtain anything like satisfactory results.

While in the Volta Association Laboratory my attention was frequently drawn to Patent matters, and since leaving the Laboratory I have applied myself to practice before the Patent Office and to Patent law, and at the same time have continued my study of phonography. I am familiar with the various phonograph patents which have been issued, from the first one of Mr. Edison in 1878 up to the present. I am also acquainted with most of the literature on the subject.

Mr. Edison's patents (issued in this country) are: No. 200,521, February 19, 1878; No. 201,760, March 26, 1878; and No. 227,679, May 18, 1883, and his British Patents are numbers 2909 of 1877 and 1644 of 1878, all of which relate to phonographs, and I understand the construction and operation of the devices described therein.

Descriptions of the phonograph are also found in the

17th
Scientific American of November 7, 1877 and December 22, 1877; Appleton's Annual Encyclopedia 1877, The North American Review for June 1878; Scientific American for 1878, p. 118 and p.198; Scientific American for 1877, pp. 304 and 384; Supplement Scientific American #133 of July 20, 1878, and in various other periodicals and scientific works.

The Edison phonograph, as described in these patents and publications, and as it existed in 1878, employed a support usually cylindrical, upon which was laid or wrapped a sheet of soft pliable substance, such as tin-foil, upon which dents or impressions could readily be made. A vibratory diaphragm, similar to that used in the telephone, had affixed to its center a stylus with a slightly blunted point, and the diaphragm was so supported that the point of the stylus pressed against the sheet of tin-foil. In operation the cylinder was rotated spirally, and at the same time the diaphragm was spoken or sung to, throwing it into vibrations. The stylus carried by the diaphragm of course vibrated with it, and hence impressed an irregular or undulating furrow upon the tin-foil or sound record approximating more or less closely to the vibrations of the diaphragm. The reproduction of the original sounds depended upon the ability to make the diaphragm repeat its original motions. In accomplishing this the stylus was set back at the

starting point and the cylinder again rotated. The stylus was thus alternately raised and lowered by the elevations and depressions in the voice record, and the diaphragm correspondingly vibrated. The success of the result depended first, upon the fidelity with which the vibrations of the recording stylus were impressed upon the pliable sheet, and second, upon the accuracy with which the reproducing style followed the undulating line of the record thus made. In the phonograph neither of these operations was accurately performed, and therefore the reproduced sounds bore only a faint resemblance to the originals.

In the light of our present knowledge of the art it is easy to point out the causes of these imperfections. The vibrations of the diaphragm and its stylus are very minute, and none but an exceedingly soft and exceedingly pliable substance could be dented or bent by the point of the style so as to conform precisely to the complex motions of the diaphragm. In fact it may be said that the accuracy of the voice record would be in proportion to the softness of the material. It should be noted, however, that as the blunt point of the style presses on the foil the surrounding portions of the latter will also be depressed, so that it is a practical impossibility to indent, in such a substance as foil a mark of such defined outlines as

will permit of accurate reproduction. In fact if an indented record of sonorous vibrations be subjected to the search of a magnifying glass it will be seen that each depression of the foil is surrounded by slanting walls which extend for a considerable distance. It requires no great acumen to see that in a record where a large number of these depressions follow one another in close relation, there will be between each depression a wall whose height is untrue, relative to the amplitude of the sound vibration, and as the height of the wall between two adjacent depressions constitutes one of the two elements making a record, it will be seen at once that the equation of the pliability of the foil becomes one of importance.

In reproducing, moreover, the soft material being simply impressed or dented, the pressure of the style tended largely to obliterate the record, and therefore the instrument remained simply a "toy".

In the Graphophone the point of the style is imbedded in a solid but easily engraved material such as a waxy composition, but to fit it for this use the style must be wholly changed in form the length must be small and the point sharpened to a cutting edge. Since its point is continually under the surface, the vibrations of the diaphragm whether they be descending or ascending, will be entirely and faithfully record-

ed, the material in front of the point being bodily removed in the form of fine shavings, leaving a groove of varying depth. Furthermore as the surface of the material surrounding the point of the style is not depressed--for the material may be considered not flexible,--the style finds continually new and fresh material to engrave which has not been disturbed by the preceding motions of the style, and therefore records correctly.

By this means the production of a practically perfect record, the first essential step is secured. This method, moreover removes the obstacles to successful reproduction, the sound-record being here presented in a hard material, which can be used for reproduction an indefinite number of times without deterioration, and which can be handled and transmitted through the mails.

As the surface of the material on each side of the line of travel of the style is undisturbed, the lines of the record can be made very close together, and the capacity of a tablet vastly increased. In the commercial graphophone upwards of 161 lines to an inch are traced on the tablet. In addition to this, the wax-coated tablets can be made at less cost than those of tin-foil, so that the gain in economy alone, supposing the two methods to be equally practicable, is of great importance.

I have read the specification forming part of letters-patent No. 341,214, granted May 4, 1886 to Chickester A. Bell

and Sumner Tainter, and that forming part of letters-patent No. 341,288, granted May 4, 1886 to Sumner Tainter, and understand the same. I have also read the description of the Improved Edison Phonograph published in the Electrical Review (New York) of May 19, 1888, and the address of E. T. Gilliland thereon, published in the same paper. I have furthermore examined minutely and carefully the Improved Edison Phonographs exhibited at the rooms of the Electric Club in New York City during the month of May, 1888. I was furnished with a ticket of admission to the rooms of the electrical club No. 17 E. 22d Street, where I went the first time for the purpose of inspecting these instruments. About ten days later, wishing again to examine the instruments I called at No. 19 Dey Street, the office of the Company, and was then informed that the instruments had been withdrawn from exhibition. I saw, however, one of the instruments on the table; but it lacked both recorder and reproducer, and there seemed to be reluctance to exhibit these parts.

In the "Improved Edison Phonograph", as described in the journal aforesaid, and as witnessed by me on exhibition, the record is formed in the surface of a cylindrical tablet composed of wax, or a waxy composition, by means of an engraving or cutting style, the point of which in operation is constantly embedded in the wax surface.

The said Phonograph employs the method which is the subject matter of both claim 1 and claim 2 of Patent No. 341,314, viz: Claim 1.-- "The method of forming a record of sounds by impressing sonorous vibrations upon a style, and thereby cutting in a solid body the record corresponding in form to the sound waves, in contra-distinction to the formation of sound-records by indenting a foil with a vibratory style, or cutting a strip by vibrating it against a revolving disk-cutter substantially as described". And, Claim 2-- "The method of forming a sound-record by impressing the sonorous vibrations upon a style in a direction at right angles to the re-cording surface and thereby cutting in a solid body of series of elevations and depressions of varying depth, corresponding in form to the sound waves substantially as described." It also employs the vibratory cutting-style of a sound recorded.-- Claim 3.-- and "The cutting-style in combination with a support permitting the same to be vibrated" (claim 4.) Also "A vibrating cutting-style, in combination with a tablet or other solid body in which the record is to be cut, and mechanism for supporting the same and moving it with reference to the said style", claim 6. And comprises "A sound record consisting of a tablet or other solid body having its surface cut or engraved with narrow lines of irregular or varied form corresponding to sound waves", Claim 7.

It also employs the subject matter of the following claims of the same patent viz: claims 8, 9, 10, 19, 21, 23, 24, 27.

Furthermore the said "Improved Edison Phonograph" which I examined in the rooms of the Electric Club in New York in the month of May 1888 uses "a tubular self sustaining tablet for recording sounds or sonorous vibrations", which is the subject matter of claim 4 in Patent No. 341,238, granted to S. Tainter, May 4, 1886, and also employs a "sound recorder or reproducer and operating mechanism for causing said recorder or reproducer to trace a spiral line on the tablet, an elongated cylindrical tablet holder supported and journaled so that the tubular tablet can be placed on the same",--which is embraced in claim 5 of the same patent above cited. And "a tubular tablet" and "tablet-holder for supporting and rotating the same" which is embodied in claim 6 of the same patent.

In the address of Mr. Gilliland above referred to it is stated that Mr. Edison's patents for improvements taken out in 1878 show and describe "every principle embraced in the present improved phonograph, and all the essentials of the so-called graphophone".

I have made careful and thorough examination of the said patents, including as well the British as the U. S. patents

for the purpose of ascertaining whether the principles of construction and operation and the essential features common to both the improved phonograph and the graphophone, and covered by the claims of patents No. 241,214,³ and 241,288,³ above quoted, of any of them, are found in the said Patents of 1878. I have not found any, and I give it as my opinion, after taking the utmost pains to inform myself fully on the subject, that the subject matter of each of the said claims employed both in the improved phonograph and in the graphophone, was new at the time of the applications for patent therefor, and had not been previously described in any patent or printed publication in this or any foreign country.

Edison's British patent No. 1,644 of 1878 contains descriptions and drawings of a great many details, devices, modifications and suggestions, that are not found in any U. S. patent. Among the substances therein suggested for use as the pliable or impressible recording medium, mention is made of strips of paper coated with paraffine, or other hydrocarbons, gums, or lacs. It is, however, distinctly and repeatedly stated that the record is to be made therein by indentation with a blunt style and no other mode of forming such record therein is suggested. Moreover, the specification clearly indicates that such material was, on trial, found unsuitable to receive the indenta-

tions, on account (as stated) of the clogging of "the indenting point" by the paraffine. For that reason the specification suggests the use of the waxed paper as a backing upon which to place a layer of "thin metal foil" to receive the indentations.

No suggestion of the use of wax for any other purpose than the foregoing is contained in any of the patents of Edison taken out prior to May 4, 1886; and it is evident that for the purpose of forming a record by indentation, the metal foil was found to be the most suitable material; as this was settled upon, and used in all the Edison phonographs after experimenting with ordinary paper, with paper saturated or coated with paraffine, and possibly with other substances.

For these reasons I conclude:

1. That the "Improved Edison Phonograph" employs the methods and part of the apparatus described and claimed in letters patent No. ³741,214 and No. ³741,288 aforesaid; and
2. That the methods so employed in the said Improved Edison Phonograph, were not described, shown or suggested in any prior patent of Edison, or in any prior patent or publication in this or any country.

Subscribed and sworn to before :
 : HENRY GUSTAVE ROGERS.
 me this 23th day of June, 1888. :

(Signed) Philip Mauro.

H E N R Y J. H A G E N, a witness called on behalf of the defendant, United States Phonograph Company, being duly sworn, deposes and says:

DIRECT-EXAMINATION BY MR. HAYES:

Q 1. Please state your age, residence and occupation?

A. Age, thirty-six; residence, 26 Mount Vernon Avenue, Orange, New Jersey; I am engaged in the phonograph business, record-making, principally.

Q 2. What is the name of the firm with whom you are engaged in the record business?

A. Harms, Kaiser & Hagen.

Q 3. You are a member of that firm?

A. Yes sir.

Q 4. Whereabouts is its business carried on?

A. 18 East 22nd Street, New York.

Q 5. Please state when and where and with whom you have been engaged in the business of making phonograph records?

A. I began the business in 1889, I think in the spring of 1889, in the Edison Laboratory, and continued there for about two years, or a year and a half, in taking records both *for* with the phonograph and the doll, and inspecting phonographs. From there I took a position with the New York Phonograph Company, then located at 257 Fifth Avenue, New York, taking rec-

ords, and just previous to the consolidation of the New York Phonograph Company with the North American, I accepted a position with the North American as record taker there. On the assignment of the North American, we bought the record plant then located on 14th Street, and continued the business. I then sold my interest out in that firm, then known as Walcutt, Miller & Company, and I was then one of the organizers of the Phonograph Record & Supply Company, located at 187-191 Reade Street. After that I accepted a position with the United States Phonograph Company, and was in their service until last May, when we organized this firm of Harms, Kaiser & Hagon.

Q 6. Since 1889, have you been engaged in the business of making phonograph records?

A. Yes sir.

Q 7. During that time have you experimented or worked in the matter of duplicating or copying phonograph records?

A. Yes. I started to experiment on duplicating devices --I think it was about 1891--the winter of 1891 and 1892.

Q 8. Whereabouts was it that you carried on these experiments?

A. Well, principally at the New York Phonograph Company's place, and of course, somewhat at my house.

Q 9. The New York Phonograph Company was one of the so-called sub-companies with a so-called license contract from the

North American Phonograph Company?

A. Yes sir.

Q10. Since that time have you continued experiments in regard to making duplicate records?

A. I have been connected with duplicating records up to the time that I severed my connection with the United States Phonograph Company. We are now engaged in the original record business only.

Q11. Are you, as a practical man, familiar with the art of duplicating, and with the various methods of duplicating phonograph records that have been tried?

A. Yes sir.

Q12. I show you patent of S. Tainter, No . 341,287, and call your attention to the duplicating apparatus shown in that patent. Have you examined that patent and the design shown, sufficiently to be familiar with it?

A. Yes sir.

Q13. In your opinion, as a man acquainted practically with mechanical duplicating, is that apparatus as shown in the illustration and described in the patent a practical method by which duplicates can be successfully made?

A. Well, from the experience that I have had, I should say not.

Q14. What reasons have you for that opinion?

A Well, there are various reasons.

Q15. Please state them.

A. This machine has no provision made for contraction and expansion. It has no provision made for taking up the "drunkenness", I would say, or the running out of the discs, considering that the depth of a sound-wave is very fine--not much more than the thickness of a piece of tissue paper, if either one of the two discs would run out the very slightest, it would either cut too heavy on one side and not record at all on the other, or, if there was enough power back of it, it would squash down the copper record, the electrotpe.

Q16. If instead of a copper master record, a wax master record were used, would or would not that squashing effect you speak of take place?

A. Well, with a wax record, it would be worse; you could not possibly work with a wax record.

Q17. You use the term "drunkenness". Please explain more clearly what you mean by that term?

A. What I mean by that term is that the disc has not a perfectly true face, that is, it is warped, so to speak, so that it would not be a perfectly true face.

Q18. Would it be, in your judgment, possible to have two discs arranged in the way described in that patent, with their faces absolutely true?

A I should say not. I don't see how they could possibly get two discs face to face that way, and have them true, considering, of course, that especially where the thing to be dealt with is of such a microscopical nature, that is, such a fine point.

Q19. I call your attention to the fact that the follower point described in that patent is at right angles to the face of the disc. What effect would that have on the practicability of the machine?

A. Well, when you come in having a point either on a disc in this way or on the phonograph record that is, the record that is on the market to-day, if you have it at right angles, you get a chatter, and for recording, of course, it leaves long oblong indentations--that is, not sound indentations, but a chatter.

Q20. Can you explain what you mean by the word "chatter"?

A. It is a vibration set up by the tool not being at the proper angle.

Q21. You use the term "proper angle". What is the proper angle for a tool, usually?

A. Usually about forty-five degrees.

Q22. What is the character of the indentations in a phonograph record; are they long wavelike motions or are they irregular?

A. Well, they are sharp; that is, they are not long sweeping waves, but they are sharp--very abrupt.

Q23. And what would be the result of having a tool with a follower point at right angles in connection with these sharp indentations?

A. Well, you see the object of this device would be to transmit the exact sound-wave of the positive plate, or the master plate, to the other, and being at right angles, it would have a tendency in doing that to lock it in there. Of course if there was force enough there, why it would simply squash it down or bend it over on the original record, and being it is copper working against iron.

Q24. If the master record was of wax, would this squashing effect resulting from the tool being at right angles to the face of the disc, and the indentations being sharp, would that squashing effect be greater or less in wax than in copper?

A. It would be greater.

Q25. I call your attention to the fact that the master record as described in this patent, consists of a ridge with indentations on the summit of the ridge, and not of a groove with indentations in the bottom of the groove. What would be the effect of attempting to have a follower follow indentations on the top of a ridge?

A. Well, the follower being on top of the ridge, and

looking at it from the point of the record that is made now-a-days, one hundred threads to the inch, it would not take a great deal of contraction or expansion for the follower or tracer to work in between the ridges.

Q26. Well, if that follower, instead of following the top of the ridge, went in between the ridges, what result would that have in the copy produced?

A. You would get no record.

Q27. Are you familiar with the general type of duplicating machine that has been successfully used by the various manufacturers of duplicate phonograph records?

A. Yes sir.

Q28. In your opinion, could a practical machine be made in which the bar connecting the master with the copy to be made is a rigid bar, moving longitudinally, as distinguished from a bar moved on a hinge or pivot?

A. It would be impossible.

Q29. Why do you think that would be impossible?

A. Why, I give that answer from an experience that I have had in my first experiments in duplicating. I had a barrel, fixed--that is, on a rigid arm, running from the back rod sleeve to the straight edge of a regular Edison phonograph, with mandril suspended over the bottom one, and my first idea of a duplicating apparatus was to have a spiral spring in a

barrel, and through this barrel and through this spring and arm connected with the sapphire arm of the weight, but I found that in putting this bar with the reproducing needle when brought in contact with the upper cylinder or the master, I found it would chatter and by getting it off of the right angle and getting it off to one side, it would ^{have} be a tendency to press to one side of this barrel and cause a friction so great that I got no record at all underneath.

Q30. Can you tell when the duplicate phonograph records were first made successfully, from a commercial standpoint, and put on the market?

A. Well, the New York Phonograph Company put on a very good duplicate in 1892. Of course, I don't know whether anybody had put any on the market previous to that, but we had a very good duplicate at that time.

Q31. Do you know of any one else putting a successful commercial duplicate on the market before that time?

A. I do not. I know Mr. Edison had been experimenting on a duplicating device, but I had never seen it, and I don't know what the results were.

CROSS-EXAMINATION BY MR. EDMONDS:

XQ 32. Did you ever see a duplicating machine constructed in accordance with Figures 1, 2 and 3 of the Patent, No. 341,287

A. No sir, I never did.

XQ33. Did you ever attempt to make a duplicate record on a disc?

A. No sir, I never tried to make one on a disc.

XQ34. Is it not the fact that such experiments as you have conducted, designed to produce duplicate sound records, were made upon duplicating machines consisting in part, at least, of Edison phonographs?

A. Yes.

XQ 35. Is it not a fact that all of your experiments were upon tubular blanks?

A. Yes sir, the regular phonograph or graphophone blanks --the regular tubular blanks as used at the present day.

XQ 36. Made of soap, or wax, or paraffine, or something of that nature?

A. Yes sir.

XQ 37. When you were engaged in these experiments, did you find that your products ever chattered?

A. Why, as I say, that first experiment of mine did.

XQ 38. Did it chatter continuously from the time the cutting point entered the material until the time it left it?

A. In that experiment, yes.

XQ 39. So that when you took the record out of the machine and put it under a reproducer, you could not hear anything?

A. Well, you could hear a continual--sort of a knocking

sound.

XQ 40. But you could not detect the record?

A. You could not detect but very little music; you could hear notes of it at times.

XQ 41. But do you mean that part of the time you heard the selection which had been placed on the duplicate, and part of the time that was obliterated, and nothing sounded but the chatter?

A. No; what I mean to say is that you could hear a note all the way along, that is, until it run out of adjustment; that was one of the bad features of this idea that I speak of, that of course, it was rigid and it had no lateral motion, and of course, it could not take up the contraction and expansion, and it finally ran out of the groove altogether.

XQ 42. You have referred to a machine which, in your opinion, or in the opinion of defendant's counsel, proved commercially satisfactory later on in the exploitation of the business. Is it a fact that none of the records produced from this commercially satisfactory machine bore the slightest evidence of chatter?

A. Well, there was a time in the early part of the method of making duplicate records, where you would, once in a while, hear just one knock, but that was finally got so that there was no knocks at all heard, that is, no chatter at all.

XQ 43. I don't think you answer the question. Do you mean to assert that as matter of fact, the duplicate sound records now upon the market, whether made by the commercially satisfactory machine, or by another, do not betray the slightest evidence of chatter?

A. Well, as I say, there were in the early part--that is, even after we were putting out what we called at the time the commercial record, you would at times hear a knock, which we found was due to the chatter, but it would only be one knock; but we finally got the apparatus so it worked satisfactory without any evidence of chatter.

XQ 44. Have you within the last year reproduced sound from various duplicate sound records made either by yourself or by others?

A. Yes sir.

XQ 45. Do you mean to assert that in no single instance you heard in the reproduction, the chattering which you have mentioned, in any degree?

A. No sir, I do not; that is not the chatter I have reference to, or that is generally understood as a chatter.

(Signed) Henry J. Hagen

UNITED STATES CIRCUIT COURT
District-of-New-Jersey-----x

-----x

AMERICAN GRAPHOPHONE COMPANY

In Equity Patent
#341,267.

-against-

UNITED STATES PHONOGRAPH COMPANY *et al*

-----x

Testimony taken on behalf of the Defendant before
S.D. Oliphant, Esq. Standing Examiner, under the Sixty-seventh
Rule in Equity, as amended.

Met pursuant to agreement of Counsel in Room 132,
Aldrich Court, 45 Broadway, New York City, at 11 A.M.,
Tuesday, October 11, 1898.

Present: S.O. EDMUNDS, ESQ. and C.A.L. MASSIE, ESQ.

of counsel for Complainant, and

A. PARKER-SMITH of Counsel for Defendant.

JOHN C. ENGLISH a witness produced on behalf of
the Defendant, having been duly sworn by the Examiner, tes-
tifies in response to questions by Mr. Parker-Smith, as
follows:

Q1. Please state your name, age, residence and
occupation.

A. John C. English, age 43 years, residence 125
West 90th Street. New York City. occupation a pharmaceutical

chemist, but for the past ten years engaged in mechanical pursuits, taking out patents, and also in the manufacturing ^{under} of same.

Q2. Have you had any experience in the making of sound records on the phonograph or similar talking machine, and if so, please state what ^{that} experience has been.

A. Yes. During my connection as manager of the Edison Phonograph Works, ~~I was brought intimately~~ in 1889 and 1890, this subject was constantly before me, having superintended the manufacture of records for a great many thousand talking dolls. After leaving the employ of the Edison Phonograph Works in 1890, I became Superintendent of the New York Phonograph Company, 257 Fifth Avenue, where large quantities of records were made, and during this time recognizing the necessity of a machine that would successfully reproduce or make duplicate records, I devoted very much of my surplus time to accomplish the result. This result I obtained in the fall of 1890.

Q3. Please state a little more fully what your researches were into this matter of making duplicate records, explaining the object to be attained, and the condition of the art of making duplicate records at that time, so far as known to you.

A. In 1890, the year that I began to experiment upon making duplicate records, all records sold at that time

were what is known as original records. The cost of original records being quite high, as it became necessary to employ bands, orchestras, or other musicians, vocal or instrumental, and suitable artists were not always convenient at the time they were wanted, it had been recognized for a long time previous to this, that if records could be reproduced mechanically that were to all intents and purposes as good as the original, that the cost would be very much less and in consequence the price being reduced to the public, that the sale of these musical records would increase to such an extent as to make the phonograph business more successful than it had been. It was known to me at this time that Mr. Edison and others had been experimenting upon duplicating machines, but satisfactory results had not been accomplished as no records, known as duplicate records, were at that time being sold. The difficulties in the manufacture of these duplicate records, were mere mechanical details to adapt well known forms of duplicating machinery to this specific requirement.

Q4. Please state in a general way what measure of success you obtained in the fall of 1890 in the matter of duplicating records and whether you have since that time had occasion to keep yourself in touch with that art.

A.

A. After continuing my experiments for some months and securing successful results, these results being obtained by suspending a second mandrel of a phonograph over the mandrel of the phonograph itself, and then in the place of the diaphragm arm of the phonograph, I placed an arm for carrying a compensating mechanism to the upper point at which was placed a reproducer point and to the lower, a recording point. The two mandrels were belted together, an original record being placed upon the upper mandrel and a soap blank upon the lower mandrel, and the machine then set in motion. The vibrations imparted to the reproducer point were transmitted to the recording point and this in turn cut a record upon the blank cylinder. The compensating mechanism was necessary to take up the variations due to irregularities in the surfaces of the original record, these original records frequently changing their shape, as it is a well known fact that all substances after being heated continue to contract for a very long time, accurate glass thermometers never being graduated until having been made for one or more years, and as it would be impracticable to carry a sufficient stock of soap blanks to allow them to season, these variations must occur, and necessarily any machine that will reproduce from an original record and record upon a blank record, must have a compensating mechanism.

Since 1890 very many duplicating machines have been made and used with more or less success, but each user has generally withheld from the public the details of his compensating mechanism. Of those with which I am familiar, the general principle of two mandrels parallel to each other, is in use. Since 1890 I have done some work upon my duplicating machine idea, with the object of making the duplicate record louder than the original, but I have not completed my experiments upon my newer idea.

Q5. Have you examined and do you understand the specifications and drawings of Patent 341,287 granted Sumner Taintor May 4, 1886 (the same being the patent here in suit) so far as the apparatus illustrated in Figs. 1 to 3 inclusive, of the first sheet of drawings, and the portions of the specifications relating to the construction and operation of such *apparatus* ~~machine~~, are concerned?

A. Yes.

Q6. Please state in the light of your experience in and knowledge of the art of making sound records, both by the direct and duplicating process, whether or not, in your opinion, the apparatus illustrated and described in the portions of the patent in suit above referred to, would be operative in the manner disclosed, to produce ^a ~~the~~ usable duplicate record, stating your reasons for any conclusions, which you may give.

A. No. The machine as described in this patent would not produce results that would be satisfactory in the making of duplicate records. To describe the machine, we have a master record and a blank mounted upon a shaft face to face with a considerable distance between these two surfaces to enable the mounting of the mechanism as described. Between these discs a sliding carriage is mounted, and on the surface of this a square bar is ^A ~~journalled~~ ^{mounted in guides}; upon the end of this bar at the center is mounted an adjusting screw. This bar, or shaft extends half way across the carriage, and in a parallel line continuing from the end of this bar is also ^{mounted in guides} ~~journalled~~ another bar or shaft. The ends of these two bars are brought together at the middle by means of a coiled spring mounted upon one of them, pressing the end of the opposite one against the face of the master record, to bring the opposite end of this bar or shaft against the blank disc, the adjusting screw at the middle is operated until there is no space left between the recording tool and the blank disc. The machine is now ready to start, but it is quite evident that owing to the shallow depth of the master record which varies from one to two thousand ^{of an inch} and owing to the unequal expansion and contraction of the materials ^A used in the manufacture of the master blank, that the distances between this master and the blank at the opposite side will vary more than the depth of the record.

A And as the shaft which is to transmit the vibrations from the master record to the blank is of a fixed length, that if the machine worked the record would be reproduced only in spots. In the making of an original record of this size and shape it would be impossible to make one whose surface would be uniform equal to the depth of a phonograph record. For this reason the machine would be a failure. Secondly, the tool carrying shaft being at a right angle to the recording disc, and being mounted in suitable ^{guides} ~~journals~~, would when pressing against the face of the master record, cause the fine but blunt pointed reproducer point as described in the patent, to lock itself into the indentations of the master record, and the resistance to be overcome at the opposite end of this shaft would be such that the face of the master record would be erased or scratched out or else the machine would be stopped. If the shaft worked sufficiently loose in the journal to vibrate, this would produce another result - that of a chattering effect, frequently occurring in machine shops where lathes are not in proper working order.

Recess for luncheon.

Witness continuing:

~~According to the method of~~ Reproducing from a record which is upon the top of a ridge, as is described in this patent, ~~it~~ will also be a failure as the difference between expansion and contraction of the feeding device of the machine and the master record, will cause the reproducing point to lose its position over the record, and falling into the groove at the side of the record, fail to reproduce anything upon the blank to be reproduced upon. The reproducing mechanism upon reproducing machines, must be so mounted as to have as little frictional resistance as possible, and the parts are invariably made very light when the best results are obtained. The construction of this machine may be compared and its action would be that of a bolt mounted upon the side of a door sliding in to an indentation in the door frame. With a little frictional resistance, as is usually applied to a bolt of this description, the bolt is intended to remain firmly in its position, and no amount of shaking of the door or the door frame is expected to unbolt the door. Without this frictional resistance applied to the bar or bolt, or if the bolt was placed in a slanting position, or not at right angles to the door frame, ^{it} might be displaced, and the door open. The indentations in a phonograph record, are in some instances quite sharp, or straight upon the sides, and as the shaft

which carries the reproducer point in connection with the shaft carrying the recorder point is mounted at right angles to the face of the record carrying disc, and these two shafts must have a guide at each end, which produces much friction and as the shaft must be square or some other shape than round, it adds additional friction, the result being that when the ~~maximax~~ machine is set in motion, an action takes place that will compare with that of the bolt upon the door. It may work in spots where the record is very shallow, but where the record is of much depth the cutting tool cannot be set to cut to a depth equal to that of the original owing to the resistance being so much greater than the power that can be imparted by the slight cam-like sides of the indentations upon the master record. Lost motion exists in all machinery, and for the sliding bars to move with sufficient freedom to even overcome the resistance of a blank of soft material, the lost motion would be greater than many of the recorded indentations upon the master record. If all the recorded surfaces upon the master record were long cam-like waves, there might be a possibility of lifting or pushing outward ^{the} shaft with some semblance of success provided all mechanical details were perfect, including having the face of the master and the face of the blank run absolutely true, but as sound vibrations are in most cases ^{sharp} ~~dark~~ and sudden

indentations of greater or less depth, the position of this shaft would have to be altered to use the cam-like side of the indentation to set it into proper motion.

Q7. I notice that the drawing, Figs. 1 and 2, shows and the specification, lines 71 to 75 inclusive of page 2, describes a spring 215, designed to keep this combination of sliding recording and reproducing tool in contact with the master. Please state whether in your opinion, such a spring-controlled system of tools would be operative.

A. The spring as described, was intended by the inventor, to hold the two shafts together, that the vibrating action of one would be imparted to the other, and secondly that by means of the screw, to lengthen or shorten the shaft. The action of the spring is to force the shaft against the master record, but the introduction of this spring produces another very strong element of friction, which if made sufficiently strong to prevent the two sections of the shaft from vibrating apart, would also have the effect of pressing so hard against the master record as to destroy one made of a soft material, or to lock the reproducing point into the deeper indentations of the master and to retard the action of the machine. This spring would also have the effect of withdrawing the recording knife from any portion of the blank record which might have contracted from the true level of the blank, and thus produce no record upon

the blank disc.

Q8. I notice that the cutting tool, as shown in the drawing, is substantially at right angles to the line of travel of the surface of the blank on which it is supposed to operate. What effect, if any, would this angle have upon the operation of the tool and how does it compare with the angle of inclination of the cutting tool in all practical duplicating machines, with which you have worked, or whose operation you have observed?

A. The angle of the recording knife must be set with great exactness, or else very unsatisfactory results are obtained. A knife of the shape as described in the patent would produce unsatisfactory results if mounted at a right angle to the face of the disc. The most natural result of so mounting a tool of this description would be to dig itself into material without removing the chip. The angle of the cutting tool upon all recording machines is so placed that any unusual resistance with which it may come into contact, will still allow it to perform its function, but if the resistance be too great the only result could be a record not quite as deep as it ~~usually~~ would be if there was less resistance to be overcome.

Q9. In the practical duplicating machine, is the cutting tool so inclined to the surface of the blank that the point of the tool is behind the point of support

of the tool (Looking in the direction of travel on the surface of the blank) or in advance of that ~~xxxx~~ point of support. I assume that it must be one or the other of these positions if the tool is not at right angles to the line of motion.

A. As I understand the question, it is behind the point of support, but to more properly describe its position, it should be so placed that if ~~there is~~ ^{should occur} a vibratory action of the ~~part of a~~ knife mounting, the knife would retreat from the face of the record rather than embed itself into the material.

Q10. In any practically operative recording machine, which you have seen, whether for duplicating or making original records, was there a knife or recording tool mounted in sliding bearings, such as those described in the patent?

A. No.

Q11. How are the cutting tools always mounted to give them their freedom of motion to and from the surface of the blank?

A. Upon pivoted arms.

Q12. In your opinion could any device be operative ^{sound record} to make a faithful duplicate in which the cutting tool had to slide up and down in the slide bearings, like the tool in the patent?

A. No.

Q13. The patent describes a master record formed in copper by electrotyping, while the blank on which the duplicate is to be made, is of iron. What is the relative hardness of copper and iron, generally speaking, and what bearing does this have, if ~~advantages had if~~ any on the question of the operativeness of the machine as described in the patent?

A. The comparative difference between electrolytic copper and iron is very great in hardness. A copper electrotype is the purest form of copper, and the purer copper is, the softer it is, while the iron in its softest state, is still many times harder than the copper. ~~The effect of the recording knife~~ The resistance on the part of the iron to the recording knife in conjunction with a shaft mounted at right angles to the face of the record, and the ~~xxx~~ would be frictional resistance of the slide bearings and spring ~~as~~ to erase, or rub down the soft copper master record.

Q14. On page 2 of the specification, beginning at line 91, the patentee says:

"If the iron be too hard, or if for other reason it is not desired for it to be cut to the full depth at one operation, the cutting tool can be adjusted by the screw 214, first to cut a shallow, and then, when the parts have been returned, adjusting it and causing it to cut deeper, and so on until the desired depth is reached."

Please state whether, in your opinion, the process of forming

a record by several successive cuts, would be practical.

A. It would be impossible on such a machine to so adjust it that the recording tool would follow the track of the first cut. Some of the indentations or cuts or a master record are so fine and close together that two or three degrees change in the temperature would so expand or contract either the master or duplicate record, that the cutting tool would erase the record of the first cut, sufficiently to destroy its value. A reproduction of such a record would probably reproduce the record as if it were being made by two persons or two instruments.

Q15. Do you mean that the master record and the duplicate would be so shifted that the depressions in one would never again come exactly opposite the elevations in the other, and vice versa?

Objected to as leading.

A. That is what I mean, but there would be another effect upon this machine if it worked at all, and that would be that as the distance between the two discs is a fixed one, and as the length of the shaft is a fixed one, that when the machine was set into operation that some of the indentations would not be recorded in the first instance, and when the record was gone over in the second time with the tool readjusted, that this second record would be another

record and in a different position from that of the first, completing distorting and failing absolutely as a record.

Q16. Assuming that in place of the copper and iron materials of the patent, a master and duplicate, blank of ~~the~~ waxlike material, or of the modern soap or stearate compound were substituted, would the causes which you have stated as rendering the patented apparatus inoperative, be aggravated or diminished?

A. They would be aggravated.

Q17. Assuming that in place of the disc-shaped master and duplicate blank of the patent, a master and blank of the modern cylindrical shape were substituted, ~~would~~ ~~the~~ formed of wax, or the modern soap compound, ~~would~~ the process of electrotyping spoken of in the patent, be practicable?

A. While it is practical to make a flat electrotrotype, it has not been found practical to make a cylindrical ~~record~~ ^{sound} copper electrotrotype record. This process would necessitate so many transfers as to carry with it all the imperfections of the system. There have been very many experiments to accomplish this result, none of which, to my knowledge have been successful.

Defendant's Counsel states that he will close

the direct examination of the witness at this point, reserving the privilege of recalling ~~him at another branch of the case~~ him for examination on another branch of the case at an early date.

Adjourned to Wednesday Oct. 12, 1898. at 10 A.M.

here

October 12, 1898.

Met pursuant to adjournment.

Present: Counsel as before.

CROSS EXAMINATION BY MR. EDMONDS:

XQ18. Have you ever seen or operated a duplicating machine constructed in accordance with Figs. 1 to 3 of the patent in suit?

A. No.

XQ19. Then it follows, does it not, that the conclusions which you have reached with respect to the operativeness or inoperativeness of such a machine are based wholly on your individual opinion, and not upon any personal knowledge as to the facts? Am I correct?

A. My opinion is based upon very many experiments of an analagous character in phonograph experimental work, and in mechanical devices where similar results were aimed at. The right angle position of the reproducer point carrying shaft to the face of the record with its abrupt cam-like indentations is similar to movements that I have tried upon mechanical devices where a quick cam was expected to impart motion to a shaft set at right angles to the center of the cam, and I found it necessary to place a small friction roller at the end of the shaft in ~~what would be~~

~~upon the machine described in this patent~~

at the place corresponding to where the reproducer point is placed upon this machine to prevent friction and a stoppage of the machine. The reproducer point upon this machine will produce similar results to those that I have described upon cam operated movements.

XQ20. I have not asked you as to your experiments with other and different machines. You have said that you never even saw a duplicating machine constructed in accordance with Figs. 1 to 3 of the patent in suit. This being true, does it not follow that your conclusions with respect to the operativeness of such a duplicating machine, are based solely and wholly upon your personal opinion, and not upon any knowledge of the facts?

A. As devices in theory and general construction very similar to the drawings of this patent, have been in general use for very many years, my opinion is based upon a general ^{Knowledge} of a practical kind as to what would be the result of a machine so constructed.

XQ 21. ~~Question~~ XQ20 repeated and the witness is requested to answer Yes or No.

A. My experiments with machines embodying the movements as described in this patent has been so extensive that they have ~~amounted to~~ practically covered experimentally machines so closely resembling this one that I can almost say that I have approached so closely to this con-

that my conclusions are based upon experience. I believe that my reason for never having seen a machine constructed accord to this patent is that being inoperative it was never used nor exhibited in public during the many years that I have been connected directly or indirectly with the talking machine business.

XQ22. You prefer to give that reason rather than the reason expressed in your answer to Q4, that "each user has generally with-held from the public" ~~and~~ the construction of his machine, do you?

A. My answer which you quote referred to duplicating machines using cylindrical records of soap, and of a different construction, ~~which~~

XQ23. Referring now to your answer to XQ21, will you produce or permit the inspection of the machine or machines by means of which you "closely approached" the machine of the patent in suit, in order that the Court may not be compelled to accept your vague statement as to correspondence between such machines and the machine of the patent ?

A. I have a machine with a movement such as I have described, which is subject to inspection, and if desired I will furnish you prints which will properly describe the movement to which I have referred. X

XQ24. Will you produce that machine and the blue prints you refer to at the next session?

A. Yes.

XQ25. Now leaving out of consideration all of your criticisms of the patented structure, save that referring to the expansion and contraction of the material, I understand you to assert that by reason of this defect alone the patented structure would be inoperative. Is this true?

A. I mean that the machine would be inoperative for several reasons.

XQ26. You mean for any one of the several reasons expressed in your direct examination?

A. Yes.

XQ27. And one of those reasons was the expansion and contraction of the master record on blank, is that so?

A. I mean that owing to the machine having no compensating mechanism, it would be inoperative. All machines I am familiar with for making duplicate records have overcome expansion and contraction by a suitable compensating mechanism.

XQ28. We will take up the subject of compensating mechanism later. For present purposes it is or is not your criticism that the patented machine would prove inoperative in practice by reason of the expansion and contraction of the record and blank. Now, which is it?

Question objected to as already answered in substance.

A. Expansion and contraction in conjunction with the imperfections above alluded to would make the machine inoperative.

XQ29. Then it is your assertion that since the drawings do not show compensating mechanism, the machine would prove inoperative by reason of the expansion and contraction of the record ^{and} blank. Is that true?

A. A shaft carrying recorder ^{and} reproducer points being of fixed length, they would not be able to adapt themselves to any irregularities which might and do exist in all such surfaces.

XQ30. Then your answer to XQ29 is "Yes" is it not?

A. Not necessarily, as the expansion and contraction may have taken place upon the master and blank before being placed upon the machine, thus distorting the surface one or two one thousandths of an inch, and making the machine inoperative for the want of a suitable compensating mechanism.

XQ31. Regardless of when this action of expansion or contraction took place, is not your assertion stated in XQ29?

~~A. The machine is inoperative so long as the expansion and contraction is not provided for.~~

A. The machine was inoperative so long as the expansion and contraction is not provided for, and in

answer to your XQ29, my answer is Yes, for all practical purposes the machine is in operative.

XQ32. And it is in connection with this contraction theory which you have advanced that you assert that "all substances after being heated, continue to contract for a very long while " in your answer to Q4, is it?

A. All substances contract or expand with the variations in temperature. I do not thoroughly understand the question.

XQ33. Do you question the operativeness of the patented structure in the respect now under discussion, because and by reason of the fact that "all substances after being heated continue to contract for a very long while"?

A. The machine being mechanically imperfect is incapable of taking care of substances that have altered their shape by expansion or contraction, or that may alter their shape by expansion or contraction while in use.

XQ34. You either do or do not criticise the patented machine as stated in my last question. Which is it, Yes, or No.

Defendant's Counsel objects to the question as immaterial, irrelevant and altogether trivial, and respectfully calls attention of the Court to the fact that the witness

was endeavoring to express his real meaning in the clearest possible terms.

Complainant's Counsel is quite willing to leave the issue tendered by Counsel for Defendant, as well as the merit and good taste of entering such an objection in the hearing of the witness, who has during the entire cross examination sought to evade the questions, to the appreciation of the Court.

Defendant's Counsel denies that the witness has so far as he can discover, attempted to evade any proper question.

A. Expansion and contraction is incidental to the failure of the machine, not that the substance would contract sufficiently at the moment while being used, but that the master record may have contracted in making sufficiently to lose its shape, and the blank would have lost its shape sufficiently in being transferred from the shaying device to the duplicating machine.

Xp36. Since you manifest a determination not to put your criticism as to the operativeness of the patented machine into the form of a definite and certain proposition

I will ask you if you ever made a disc sound record by cutting the record groove in wax and making an electrotype therefrom as described in the patent in suit.

A. No, I have not.

XQ36. And not having made such a record you never tried to reproduce therefrom upon an iron blank. Is that true?

A. Yes, it is true.

XQ37. I presume you know that a sound record can be cut into crucible steel by means of a diaphragm having a cutting style attached, the diaphragm being set in vibration by the voice directly.

A. I know that records have been cut on all metals but the harder the metal the fainter the result, but it must be remembered that the construction of a recording machine operated by the direct action of sound waves upon a diaphragm, is very different from the patent in suit.

XQ38. As a general proposition which is harder, crucible steel or iron?

A. Crucible steel.

XQ39. In referring to the contraction and expansion of a metallic disc, is it your contention, supposing that such disc was heated when in course of construction, that this would expand and contract for an indefinite period according to temperature changes?

A. Metals all expand and contract with variations of temperature, but in answer to your question you ask if contraction and expansion would continue for an indefinite period, if the disc were heated when in course of construction, the expansion and contraction would take place whether or no the disc had been heated while in course of construction.

XQ40. Assume a disc such as the disc 204 of the patent in suit, constructed in accordance with the specification of the patent, and say twice the size shown in Figs. 1 and 2 of the drawings. Between what ranges in temperature would such a blank expand or contract appreciably?

With

A. ~~The~~ suitable testing instruments a very few degrees could be measured. Upon a flat surface or a disc like the one described, expansion or contraction frequently distorts the surface of the disc, which is the important working point for use upon such machine.

XQ41. Have you ever measured by means of "suitable testing instruments," the expansion or contraction of such a blank as the patent in suit describes? under any variations of temperature?

A. I have measured flat surfaces by means of parallel rules, that have changed their shapes under variations of temperature.

XQ42. Have you, or have you not performed the

operation stated in the last question, and if Yea, what was the result?

A. I have never had occasion to make measurements ^{or tests} of this character. Such work as I have done has been in testing the accuracy of the face of metallic surfaces that have been affected by expansion or contraction.

XQ43. When you refer to the objection of expansion or contraction in connection with a machine such as that disclosed by the patent in suit, you refer, do you not, to such contraction or expansion as is due to temperature changes at the time of the operation of the machine, and not to expansion or contraction following and due to the method of constructing the metallic blank. Is this a correct state^{ment} of your position?

A. The principal difficulties from this source would arise first in the preparation of the master record in the process of making and in the handling, it is a very difficult matter to keep it in its proper shape, and in backing it up with plaster of Paris, as is described in the patent, it would be a matter of impossibility to make the face of this record perfectly level, and in the making of the blank it is assumed that this is not a great mass of metal, but is a disc as illustrated and described in the patent, and to make such a disc with a true surface is an operation very difficult to perform, especially so when its

surface must not vary a thousandth of an inch, as would be
make
required to ^{make} the record by means of this duplicating machine.
To make such a disc it must be of considerable thickness
and to give it a suitable surface the surface must be ground
and polished, and the resulting heat so affects the surface
that it is practically impossible to make such a disc true
enough for the purpose here intended without such changes
in the mechanism as would overcome these slight variations
in the surface. The changes ~~wh~~ in temperature which might
take place in a factory would be sufficient to distort
this disc while upon the machine .

XQ44. Is it your position that a "compensating
device" to which you have heretofore referred, is necessary
by reason of this contraction of the parts?

A. It is necessary. that a compensating mechanism
could be used to overcome irregularities in the surface of
the master record and the blank through mechanical imperfec-
tions in the process of manufacture or through expansion and
contraction incidental to manufacture.

XQ45. Then assuming the absence of mechanical
imperfections, and further assuming a constant temperature
during the period of operation, a "compensating device"
would be unnecessary?

A. A compensating device would be unnecessary

provided the mechanism for transmitting the vibrations from the master to the blank were constructed somewhat different from those described in the patent.

XQ46. Different in what respect?

A. ~~That of the shapes~~ In that the square rod 213, carrying the reproducer point, and the corresponding rod 211 at the other side of the machine, if placed at a suitable angle, the result might be somewhat of a record.

XQ47. But if these instrumentalities were placed at right angles as shown in the drawings, your idea is that no kind of a record would result, is it?

A. Not a satisfactory record.

XQ48. Do you mean that you could not reproduce from it?

A. The supposition is that the record would be a "chattered" ~~shortened~~ record, unsatisfactory for the purpose intended.

XQ49. Do you mean that due to the relativity of the instrumentalities you mention, and the blank, reproduction from the record formed on that blank would be accompanied by the foreign sounds commonly called "chattering"?

A. Chattering as understood is produced by the vibration of the tool upon a lathe or any machine tool due to being placed in an improper position to properly accomplish the purpose intended, lost motion in a machine is a frequent cause of chattering. A lathe tool or any form of cutting

tool if too long will spring and the vibration will produce a roughened surface upon the work which is called "chattering". If this chattering action takes place upon this machine the false vibration would also be recorded with the record, destroying the value of the record.

XQ50. Then in the sense defined in your last answer, your response is Yes to the last question?

A. Yes it is.

XQ51. Referring now to your second criticism as to the operativeness of the patented machine, how do you explain the tendency of the "blunt pointed reproducer point" (presumably the ^{point} 213 of the patent) to "lock itself into the indentations of the master record"

A. This is due to being set at a right angle to the face of the record, and to the frictional resistance of the mechanism and the resistance of the material upon which the record is to be reproduced.

XQ52. Can you define the circumstances under which in the operation of ^a the machine constructed in accordance with Figs. 1 to 3 of the patent in suit, the follower would "lock itself" into the master record, giving the selection to be placed upon the master record the degree of hardness of material used in the construction of the machine, and the degree of the resistance of the parts which you have alluded to?

A. With a machine constructed according to Figs. 1 to 3 of the patent, and an effort was made to reproduce a record, the original record being of irregular surface at some one point, equal to 1 or 2/1000 of an inch, and the machine having been adjusted at a point which was ~~fartherest~~ from the face of the blank to be reproduced upon, when this higher surface came into contact with the reproducer point the distance being shortened more than the knife was capable of cutting itself into the blank, the effect would be to stop the machine; ^{that} the indentations in the master record acting as a lock on one side which the resistance of the material at the other could not be overcome. Any selection upon the master record would produce this result; if the mechanical power operating the machine was great enough the softer substance, in this case being the copper electrotpe, might be cut away and a groove with irregularities produced at the opposite side.

XQ53. By "irregular surface at some one point" do you refer again to your theory of contraction and expansion of material?

A. I refer to the impossibility of taking a copper ^{if} electrotpe which in practice is very thin and even~~ly~~ made, of 30 or 40/1000 of an inch in thickness, and then backed up with plaster of Paris that it would be impossible to make the surface true within several thousandths of an inch,

Some points being raised and others depressed, the removing of an electrotpe sheet from the original form would produce some of these imperfections . There would be no way of flattening the surface of this electrotpe when backed up by plaster of Paris, as is usually done by electrotppers for printing purposes. They accomplish this result by backing it with lead, and notwithstanding this it is customary in printing offices to insert in the bed of the press pieces of paper and sometimes cardboard to compensate for these irregularities to properly print from even a small electrotpe.

XQ54. In stating your conclusions as to the operativeness of the ^{patented} machine, I presume you had in mind such a machine as is illustrated in Figs.1 to 3 of the drawings? Would your criticisms apply equally well were a blank used composed of ^{the} ~~a~~ modern soap, or other waxlike material?

A. My criticisms would also apply to a blank of modern soap material.

XQ55. Would they also be applicable to a master formed of material other than that mentioned in the specification of the patent in suit?

A. They would.

Adjourned to October 13th 1898 at 10 A.M.

Oct. 13, 1898.

Met pursuant to adjournment.

Present: Counsel as before.

CROSS EXAMINATION CONTINUED:

XQ56. Have you produced the machine and blue prints to which you referred yesterday?

A. Yes.

XQ57. The blue prints, as I understand, illustrate the machine which you have produced.

A. Yes.

XQ58. And that machine is not a sound record duplicating machine, but is a time recorder designed for use by employes, etc. Am I correct?

A. Yes, the machine is a time recorder. It has a movement in its construction which illustrates the principle of the cam-like indentation acting upon the reproducer point of the patent in suit.

XQ59. The movement that you refer to is that of the part k' carrying the anti-friction roll k, and the cam K. Is that true?

A. Yes.

Complainant's Counsel offers in evidence blue prints produced by the witness, (comprising two sheets) and the same are marked

Sheet 1 and 2. "Complainant's Exhibit English Blue Print".

REDIRECT EXAMINATION BY MR. PARKER-SMITH:

RDQ60. Have you any sketches or exhibits illustrating the fact that the sound record has "cam-like indentations acting upon the reproducer point"?

A. Yes. I have one sheet of pen sketches ~~and two sheets~~ and one phonograph record. I have placed this record on exhibit to illustrate the curves produced in cutting a record. Also to reproductively illustrate what is known as chattering when a record has been improperly made, there being a few words upon this record that have been chattered by false vibrations made by the recording machine. Fig.1 is a magnified illustration of a reproducer point. Fig.2 illustrates the face of a cutting tool. Fig.3 various shapes produced by the cutting tool in the making of the record. Fig.4 illustrates a cam with an indentation corresponding to what would be a deep single cut as made by a recording tool in the making of a sound record. The indentation in this cam corresponds to the indentation marked "Fig.3 Cross Section of "Phonograph Record". ~~The illustration~~ *the* The cutting tool travels from C in illustration in the *is* *1* direction of A and B, as indicated by the *arrow* *1* arrow. The ~~retarding~~ *retarding* effect upon the reproducer point would be very great when in recess A of Fig.3, and comparatively light when in recess B or C.

I found in my experiments in the use of cams upon my machine as is illustrated by blue prints, which are in evidence, that when I used a quick cam without making a roller contact with the face of the cam that the resistance was so great at times as to prevent the machine from operating, making it necessary to use spring mechanism too strong and out of proportion to the requirements of the machine.

Defendant's Counsel offers in evidence the two exhibits produced by the witness in answer to the last question and the same are marked respectively "Defendant's Exhibit English Phonograph Record" and "Defendant's Exhibit English Sketch".

At the request of the witness the machine produced by him is not placed in evidence as he is using the same as a pattern for the machinists and pattern makers.

It is stipulated, however, by and between Counsel that the said machine will be produced by Defendant's Counsel at any reasonable time and place upon reasonable notice from Complainant's Counsel.

John C. English

EXAMINATION CLOSED.

Adjourned till new notice.

Legal 0-225

UNITED STATES CIRCUIT COURT.
DISTRICT OF NEW JERSEY.

AMERICAN GRAPHOPHONE COMPANY,

vs.

UNITED STATES PHONOGRAPH CO., ET AL.,

In Equity.

On Patents 341,287.

Testimony taken on behalf of the defendant United States Phonograph Company, in the above stated cause, before S. D. Oliphant, Esquire, standing commissioner, pursuant to notice, at the hour of eleven o'clock in the forenoon of Saturday, November 20th/ 1898, at the offices of Messrs Hayes & Lambert, Prudential Building, Newark, N. J., in the presence of Edward W. Hayes, Esq., on behalf of the defendant, and S. O. Edmonds, Esq., on behalf of the Plaintiff.

By stipulation between the counsel of the defendant and the plaintiff, the said testimony was taken in shorthand.

A L F R E D C L A R K, a witness produced on the part of the defendant, United States Phonograph Company, being duly sworn according to law, on his oath, deposes and says:

DIRECT EXAMINATION. By Mr. Hayes.

Q What is your age and residence?

A I am twenty five years of age, and reside at Newark.

Q What is your employment?

A I am in the Phonograph business; with the United States Phonograph Company.

Q What office do you hold in that Company?

A I am manager of the office, and superintendent of the Company.

Q Are you an officer of the Company, in addition?

A I am Secretary of the Company.

Q And a Director?

A Yes, sir.

Q How long have you been with the Company?

A Since the latter part of March, 1897.

Q What Company, in connection with the Phonograph ^{business} ~~Company~~, were you first connected with or associated?

A The North American.

Q When did you become connected with that Company?

A In September, 1889.

Q How long did you remain with that Company?

A Until it went into the hands of a Receiver, which was in August, 1894.

Q What position did you hold in the North American Phonograph Company during those five years?

A Clerk in the office, and finally I had charge of all the ^{orders} ~~offices~~ and ^{billings} ~~buildings~~. *R. L.*

Q Has the position you held in the North American Phonograph Company enabled you to become familiar, in a general way, with the talking machine business, as carried on by that Company?

A Yes, sir.

Q Are you familiar with the so called duplicating machines that have been used by the United States Phonograph Company?

A Yes, sir, perfectly.

Q Did you see a sketch of one of those machines which was prepared on behalf of the defendant, the United States Phonograph Company, and furnished to the counsel for the plaintiff in this suit?

A Yes, sir.

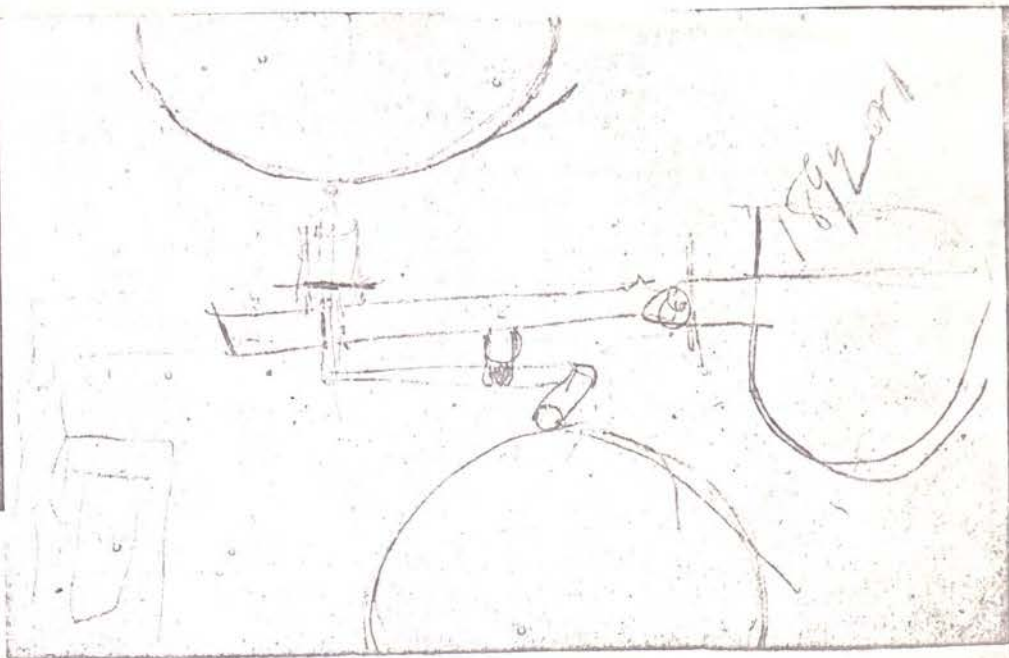
Q From what was that sketch made. From what was the sketch actually furnished to the plaintiff's counsel, made?

A From a rough draft which I made of the machine.

Q From what was that rough draft made?

A Directly from one of the machines used by the defendant.

Q Please describe that machine in a general way?



- A It is a regular Edison Phonograph with a second mandrel, above the regular mandrel, and a mechanical connection to cause it to operate with the original mandrel.
- Q By operating, you mean move synchronously with the original mandrel?
- A Yes, sir.
- Q And in a general way, what do you know of the connection between the two mandrels, which enables the record on the original cylinder to be copied on the blank cylinder?
- A There was a reproducing stylus which is connected with the recording stylus, and the mechanical movements of one are transferred to the other.
- Q Upon which of the cylinders is the recording stylus touched?
- A It touches the cylinder on which the sound record is made.
- Q And the re-producing stylus is in contact with what?
- A With the original record.
- Q Do you know where these phonographs came from which was part of this apparatus?
- A Yes, sir, to the best of my knowledge the phonographs used by the defendants came originally from the North American Phonograph Company.
- Q And from what company did the United States Phonograph Company get these machines?
- A The New Jersey Phonograph Company.

Q What relations had the New Jersey Phonograph Company with the North American Phonograph Company?

A It was a licensee for the State of New Jersey.

MR. EDMONDS:- Objected to as incompetent.

Q From your acquaintance with the affairs of the North American Phonograph Company, do you know whether the North American Phonograph Company, sold and leased Phonographs to the New Jersey Phonograph Company?

A Yes, sir, it did.

Q From your knowledge of the phonograph business, can you state whether any other company or person in the United States were engaged in the business of selling and leasing phonographs, except the North American Phonograph Company, and those who purchased from it?

A There were not, to the best of my knowledge.

Q Are you sufficiently familiar with the affairs of the North American Phonograph Company, to know if a license fee was paid to the American Graphophone Company, by Mr. Lippincott, president of the North American Phonograph Company, for some of the Phonographs sold and leased by the North American Phonograph Company?

MR. EDMONDS:- Objected as to incompetent.

A Yes, he paid license fees.

MR. EDMONDS:- Same objection is made to the answer.

Q Do you know whether the phonographs sold to the New Jersey Phonograph Company, were sold, and those on which a license fee was paid by Mr. Lippincott, to the American Graphophone Company, was charged against him or to his estate in connection with the American Graphophone Company?

A Yes.

MR. EDMONDS:- I make the same objection to the answer, and to the question.

Q In the machines used by the defendant, the United States Phonograph Company, of which you have been testifying, what is the re-producing point made of?

A Sapphire.

Q What is the cutting point made of?

A Sapphire.

Q From whom, or from what company were, or are the producing and cutting points used on those machines, purchased?

A From the National Company.

Q Can you give approximately the dates when these Sapphire points were purchased?

A No, I cannot, I am not familiar with that matter.

Q Do you remember the character of the tablet furnished by the American Graphophone Company for the graphophones, when these machines were furnished to the North American Phonograph Company, and Lippincott?

A Yes.

Q Please describe them?

A They were cylindrical in shape, and about the length of the present soap blank, and ^{smaller} ~~similar~~ in diameter; they *HC* were also furnished in smaller sizes which were not as long, but were of the same diameter as the lone ones.

Q How were they made, - what were they made of?

A They were made of paper wound into a cylindrical form and covered with a coating of wax like material which is called ozokerite.

Q Did those tablets prove to be successful commercially?

A No, sir, they were an absolute failure?

Q How do you know they were ~~absolute~~ failure?

A Nearly all that were sent out to purchasers were returned as no good, and the result was that most of the graphophones that had been shipped out were returned, also because the cylinders were no good.

Q Do you remember the nature of the trouble found with those tablets?

MR. EDMONDS:- That question is objected to, unless it be so limited as to inquire as to the personal knowledge of the witness.

A Those that were returned seemed to crack and were totally unfit for recording purposes. In addition to that, from personal knowledge I found that they were unsuitable for good recording purposes, because the surface was not smooth enough, and they were too easily affected by changes in temperature.

Q What have you to say as to the hardness or softness of the surface in regard to their capacity to receive and reproduce a record satisfactorily?

A It was found that they would take a record, but in some way that the record would not last any length of time, in fact it was easily obliterated or nearly so.

Q What character of tablet was finally adopted for the phonograph?

A The large blank, which was generally called the soap blank

Q By whom was that soap blank made?

A By the ^{Edison} ~~United States~~ Phonograph Works. *AL*

Q Was either the phonograph or graphophone a commercial success, either for the purpose of business or amusement purposes before the soap blank was put into use?

A It was not.

Q About when did this soap blank come into use?

A As far as I remember the soap blank was used in phonographs before I went with the North American Phonograph Company.

Q Do you know what kind of blanks are now used by the American Graphophone Company with their machines they call the graphophone?

A Blanks which look like, and apparently are the same as the Edison blank.

Q By Edison blank you mean the Edison soap blank?

A Yes, sir.

- Q What kind of blanks or tablets do the defendants use for making duplicate records?
- A The Edison Soap Blank, purchased at the present time, of the National Phonograph Company at Orange.
- Q Before purchasing from the National Phonograph Company do you know from whom they were purchased?
- A From the North American Phonograph Company or from the Receiver of that Company.

CROSS EXAMINATION. By Mr. Edmonds.

- Q As I understand, the drawing to which you referred in your direct examination, illustrates the duplicating machines which the defendant company has been using for some time~~x~~ past, for the manufacture of duplicating sound records?
- A Yes, sir.
- Q And those machines are still in the possession of the defendant company and operated by it?
- A They are.
- Q Are all of them being operated?
- A Practically all of them, yes, sir; by that I mean that we are using as many as we need of them, and some times all.
- Q And some times all at once?
- A Yes, sir.
- Q Should Plaintiff's counsel call upon the defendants counsel to produce one of those machines for temporary inspection by plaintiffs counsel, will you produce one for

that purpose?

A If my counsel advises me to do so.

Q You see no objection to it yourself, but leave the matter entirely to your counsel, Judge Hayes?

A I have no authority in the matter.

Q That is hardly an answer to my question. Do you see any objection to it?

A Well, as a witness, I cannot see that I have any authority to make any objection.

Q Is there any business reason why one of those machines should not be produced for temporary inspection by Plaintiffs counsel?

MR. HAYES:- The witness refuses to answer at the suggestion of the counsel for the defendants.

MR. EDMONDS:- Plaintiffs counsel protests against the instructions.

Q Do you know when these duplicating machines were made?

A I do not. It was before my employment with the United States Phonograph Company.

Q So that your personal knowledge is limited to the fact that you found these duplicating machines in the possession of the defendant, when you entered its employ?

A Yes, sir, except that my knowledge, of the affairs of the Company since I have been with them,- do you mean my personal knowledge regarding the date of the making of

these machines, or do you mean any knowledge whatever pertaining to these machines.

QX You may assume the latter?

A No; because I have found many things through my present connection with the company, and my access to the inner details of the business.

Q Such for instance, as copies of correspondence, or bills of sale, or book records of one sort and another?

A It includes those.

Q And those are the things upon which you relied for your testimony concerning these machines, or the machines from which they were made?

A Not necessarily; because while I have knowledge of the book affairs, correspondence, etc., of the company, I also have knowledge of the affairs before my employment there, through the employes that were there before I was.

Q Do you mean assertions from them or statements made by them?

A Yes, sir.

MR. EDMONDS:- Plaintiffs counsel now enters objection to the depositions of this witness in so far as the same concerns the machines from which it is claimed the duplicating machine of the defendant were made, etc., on the ground that this testimony is utterly incompetent.

Q You have been in active touch with the affairs of the defendant company since March, 1897, haven't you?

A Yes, sir.

Q Have you attended to the preparation or distribution of circulars, catalogues, &c., or were you familiar with such preparation or distribution?

A Yes, sir, I was familiar with them.

Q Did you also familiarize yourself with what the company had done in that line prior to the time when you went into its employ?

A Yes, in a general way.

Q I understand that the defendant company kept in the form of a scrap book, copies of all those and other publications for the trade and consumers; is that correct?

A Yes, but it may not have been complete.

Q At any rate it comprises the printed matter distributed substantially, from the commencement of the business by the defendant company down to the present day?

A I believe it did.

Q Will you produce that scrap book?

A I will, if it is in existence, and my counsel advises me to.

Q When did you see it last?

A I could not say that, it was a long time ago.

Q Six months ago?

A At least that, and then I only saw it in a general way, to gain information ^{for} ~~regarding~~ the present business. H6

Q Is that scrap book the only place where copies of the

defendant company's circular and advertising matter generally can be found?

A It is, to the best of my knowledge.

Q That is to say, the defendant company itself, has no other copies?

A As far as I know it has none.

MR. EDMONDS:- I now call upon you to make search for that scrap book and produce it at the adjourned session of this examination.

Q Will you do so?

A That question was answered before when I stated that I would do so if it could be found, and if my counsel advised me to do so.

MR. EDMONDS:- Plaintiff's counsel submits to the counsel for the defendant, a request that he advise the witness to produce the scrap book in question at the adjourned session of this examination.

Plaintiffs counsel states that the remainder of the cross examination is De Bene.

Q You referred during your direct examination to certain business transactions of the North American Phonograph Company, and others having business relations with it, and also to the return to the North American Phonograph Company of certain phonographs supplied to it by the American Graphophone Company, presumably; I suppose those business relations as well as the return of the grapho-

phones and parts thereof, were shown by the books and records of the North American Phonograph Company, and by contracts and other writings. Am I correct as to this?

A I saw much correspondence regarding it; I also saw a number of machines; in fact I saw several thousand machines when I took a trip to the factory of the American Graphophone Company at Bridgeport, and took part in the general inspection which lasted for several days. In addition to those that I did see, I saw sufficient proof of the return of others. I saw bills of lading and other papers.

MR. EDMONDS:- I will repeat the question.

[The Stenographer read the question as follows:] "Q. You referred during your direct examination to certain business transactions, of the North American Phonograph Company, and others having business relations with it, and also to the return to the North American Phonograph Company of certain graphophones supplied to it by the American Graphophone Company, presumably; I suppose those business relations as well as the return of the graphophones and parts there, were shown by the books and records of the North American Phonograph Company, and by contracts and other writings; Am I correct as to this?"

A If my answer did not cover the question, then I do not understand the question.

Q I will try again. You have testified as to certain relations between the American Graphophone Company and the North American Phonograph Company, also certain relations between the latter Company and certain other companies with which it did business. I presume that the relations between these concerns were evidenced by contracts or other writings, were they not?

A They were evidenced partly by contracts and other writings but not alone by that.

Q You have also referred to the return of machines, presumably furnished by the North American Phonograph Company (which had received them from the American Graphophone Company) to certain other concerns. I presume the return of machines by the latter concerns to the North American Phonograph Company, is shown by the books of the North American Phonograph Company, is it not?

A It was shown by the books, but I don't know whether the books are in existence now, or not.

Q You are not prepared to say that the books are not in existence, I presume?

A I don't know anything about that at the present time.

MR. EDWARDS:- Plaintiff's counsel now makes a further objection to the testimony of the witness given on his direct examination concerning the relations between the American

Graphophone Company and the North American Phonograph Company, and other concerns by him mentioned; and also to his testimony concerning the return of graphophones, or parts or supplies thereof, on the ground that such testimony is utterly incompetent as shown by the cross examination.

RE-DIRECT EXAMINATION.

- Q With whom did you go to Bridgeport when you saw these machines that you say have been returned to the American Graphophone Company?
- A I went up alone, and with Mr Thomas R. Lombard who was then actively connected with the North American Phonograph Company and who was an officer in that Company, who had been there before me, and had arranged all the details with other men who were up there; so that I merely followed out his plans, and took charge of the matters as he left them, and carried on his work.
- Q What did you do up there?
- A We examined a great many machines, of course not all of them, on account of the large number.
- Q You say, "we examined them", who examined them with you?
- A There were about a half a dozen men, whose names I don't remember. They merely acted as helpers.
- Q Were they in the employ of the North American Phonograph Company or the American Graphophone Company?

A They were paid by the North American Phonograph Company.

Q How many machines did you examine?

A I could not tell you exactly.

Q As near as you can remember?

A It lasted several days, and there were several thousand machines up there. We were supposed to go over a number of them to get a general idea of the lot.

Q What was the purpose of this examination?

A I cannot say that, because I only acted under orders at that time, in carrying out this work.

Q What was the nature of the examination you made?

A The examination covered the general condition of the machines at that time, and also of numerous boxes of blanks which had been returned with the machines.

Q While this examination was going on did you come into contact with any of the officers or employes of the American Graphophone Company?

A None of the officers that I know of, and with but few of the employes of the American Graphophone Company, very few; because, if I remember right, their place was shut down then, and they were doing nothing at that time.

Q As near as you can remember when did this examination take place?

A I cannot give the exact date, but I am pretty sure that from correspondence which I have, I could give you the date.

Q That is all.

Sworn to and subscribed
before me this 26th day of
November, 1898, at Newark,
New Jersey.

The further taking of testimony in this
matter, is adjourned until the hour of eleven
o'clock in the forenoon of Monday the 28th day
of November, 1898, at the offices of Messrs
Hayes & Lambert, Prudential Building, Newark,
N. J.

UNITED STATES CIRCUIT COURT.
DISTRICT OF NEW JERSEY.

AMERICAN GRAPHOPHONE COMPANY,

vs.

UNITED STATES PHONOGRAPH CO. et al,

In Equity.

On Patent 341, 287.

Testimony taken on behalf of the defendant, United States Phonograph Company, in the above stated cause, before S. D. Oliphant, Esquire, Standing Commissioner, pursuant to notice, at the hour of eleven o'clock in the forenoon of Monday, November 28th, 1898, at the offices of Messrs Hayes & Lambert, Prudential Building, Newark, N. J., in the presence of Howard W. Hayes, Esq., on behalf of the defendant, and of S. O. Edmonds, Esq., on behalf of the plaintiff.

By stipulation between the counsel of the defendant and the plaintiff, the said testimony was taken in shorthand.

A L F R E D C L A R K recalled for.

FURTHER DIRECT EXAMINATION. By Mr. Hayes.

Q Since you have been last examined, have you looked up the question as to the dates when you went to the American Graphophone Company's factory, at Bridgeport, to examine the graphophones and cylinders, that were returned there?

A Yes, sir.

Q Where did you look up the dates?

A In a diary which I kept at that time.

Q Have you that diary with you?

A I have.

Q Please produce it?

A (Witness did so)

Q Kindly read from that diary the entries contained therein, in regard to your trip to Bridgeport, stating the dates of the entries?

A I find an entry under date of February 24th, 1892, which I quote, "Took the C. P. M. train to Bridgeport, on Thursday, February 25th, Superintendent's work at A. G. Company's factory." And on Friday, February 26th, "Went to A. G. Co. saw Mr Lombard, took 7.31 express to New York." a b

Q From those entries what days were you at Bridgeport engaged in this work?

A ^{wednesday the 24th, a b} On Thursday the 25th, and Friday the 26th/ of February, 1892.

Q Have you one of the ozokerite cylinders which were used with the graphophone when it was first put out?

A I have.

Q Will you kindly produce it?

A (Witness does so)

MR. HAYES:- The cylinder produced by the witness is offered in evidence, and marked as exhibit 1, for defendant, November 28th, 1898.

Q Where did the cylinder come from?

A It originally came from the Graphophone factory, and I got it from the North American Phonograph Company.

Q About when?

A In the Winter of 1889,- 1890, but just exactly what date I don't remember.

Q Has it upon it a record?

A It has.

Q Have you tried to reproduce it?

A I have, with no success.

Q Is this the type of cylinder that was put out by the Graphophone Company, and the kind that you stated was returned as worthless?

A It is.

Q Do you remember at all, how many of these cylinders you saw there at Bridgeport, when you made your examination there?

A I cannot give the exact number, but as I remember it, there was one portion of the factory that had a great many crates stacked up, containing these cylinders, and as each crate contained several hundred cylinders the total number

was very large.

BY PLAINTIFF'S COUNSEL:- The right of objection having been reserved by consent of counsel, plaintiff's counsel now enters timely objection to the whole of the re-direct examination, on the grounds heretofore stated ~~and~~ both during the direct examination and the cross examination; and in view of those objection, plaintiffs counsel does not care to further cross examine the witness.

Sworn to and subscribed
before me this 28th day of
November, 1896, at Newark,
New Jersey.

Alfred Black

W A L T E R M I L L E R a witness subpoenaed and
produced on the part of the defendant, United States
Phonograph Company, being duly sworn, according to law
on his oath, deposes and says:-

DIRECT EXAMINATION. By Mr. Hayes.

Q Where do you live?

A #28 Mt. Vernon Avenue, Orange, New Jersey.

Q What is your age?

A Twenty six.

Q What is your occupation?

A Making phonographs.

Q With what company are you connected?

A The National Phonograph Company.

Q That is at Orange?

A Yes, sir.

Q And is one of Mr. Edison's company's?

A Yes, sir.

Q How long have you been in the employ of the companies with which Mr Edison is connected?

A About eleven years with the exception of ~~two~~ years when I was away.

Q When did you first become connected with one of the Phonograph Companies?

A With the Edison, in 1887.

Q Had you been with any other phonograph company before that time?

A No, sir.

Q Or had you been in the phonograph business before that time?

A No, sir.

Q What Company was that, ~~that~~ you went with in 1887?

A In 1887, ~~It~~ was with ~~XXXX~~ Thomas A. Edison.

Q You were in his personal employ?

A Yes, sir.

Q What special branch of the phonograph business were you

at work in?

A The experimental branch of it, in 1887.

Q Experiments of what character?

A Phonograph records and duplicating.

Q When did you first begin experimenting with duplicates?

A As nearly as I can recollect it was in 1888.

Q Did you make any duplicating machines?

A Yes, sir.

Q During that year?

A I think we were experimenting in 1888.

Q Did you produce a commercially successful duplicate?

MR. EDMONDS:- That's objected to unless
the question is so limited as to inquire of the
personal knowledge of the witness.

A Well, we were selling duplicates in 1889 and 1890.

Q When did you first produce a commercially successful duplicate, as near as you can recollect?

A Well, it must have been in 1889; we were selling duplicates then, as near as I can recollect.

Q Do you remember ever taking a duplicate that was made on a machine that you had been working on, over to the North American Phonograph Company to show it to them there?

A Yes, sir.

Q About when was that?

A I do not remember.

Q As nearly as you can recollect?

A I could not say, but it was in the early days; I know it was at the time the graphophone and phonograph companies combined in the North American Phonograph company, and what year that was I don't know.

Q You think it was the same year that the combination was made between the graphophone and phonograph interests?

A Yes, sir, it was in 1889.

Q Was that duplicate that you took over there one that was of such a character as to be commercially successful?

A Well, that was made on a parafine wax record, and it was as good a record as any record that was commercial at that time.

Q When you say on a parafine wax record, will you explain that please. Explain how the parafine wax differs from the present cylinder that is used?

A It was softer.

Q Was that a phonograph cylinder?

A Yes, sir.

Q To whom did you show this duplicate that you took to New York?

A Mr. Lippincott.

Q How soon after that did Mr Edison or his Company begin to turn out duplicates for the market?

A That must have been four or five months after that. Of course I am only assuming these times as I recollect them.

Q I understand you to say that in giving these dates and intervals of time you are stating to the best of your recollection, and are not absolutely certain as to the exact dates?

A That is so, sir.

Q Are those dates and times approximately correct?

A Yes, sir.

Q Please state in a general way without disclosing any business secrets, if there are any business secrets connected with it, the general character of the duplicating machine which made these duplicates of which you have spoken?

MR. EDMONDS:- Plaintiff's counsel instructs the witness that in his opinion the Court will protect him in refusing to answer any question which will divulge the methods of manufacture or structural features of the duplicating machines made by the persons or concerns in whose employ the witness was at the times he has mentioned. He therefore adds to the instruction contained in the question, that the witness is not called upon to divulge any such features of construction or operation if the reason indicated exists for not doing so.

MR. HAYES:- Defendant's counsel states that he considers himself entirely competent to take care of the interests of the witness,

and also of his client with whom the witness is connected, and does not consider this warning on the part of the plaintiff's counsel as at all necessary.

(The Stenographer was requested to read the question and read the same as follows:)

"Q. Please state in a general way without disclosing any business secrets, if there are any business secrets connected with it, the general character of the duplicating machine which made these duplicates of which you have spoken?"

A Well, we had two cylinders, one parallel with the other, with a combination of levers on one end of which was the re-producing ball, on the other end the cutting stylus.

Q Did those cylinders revolve synchronously?

A Yes, sir.

Q And did either of those cylinders have on it a record before the duplicating took place?

A One has a record, and the other has a blank.

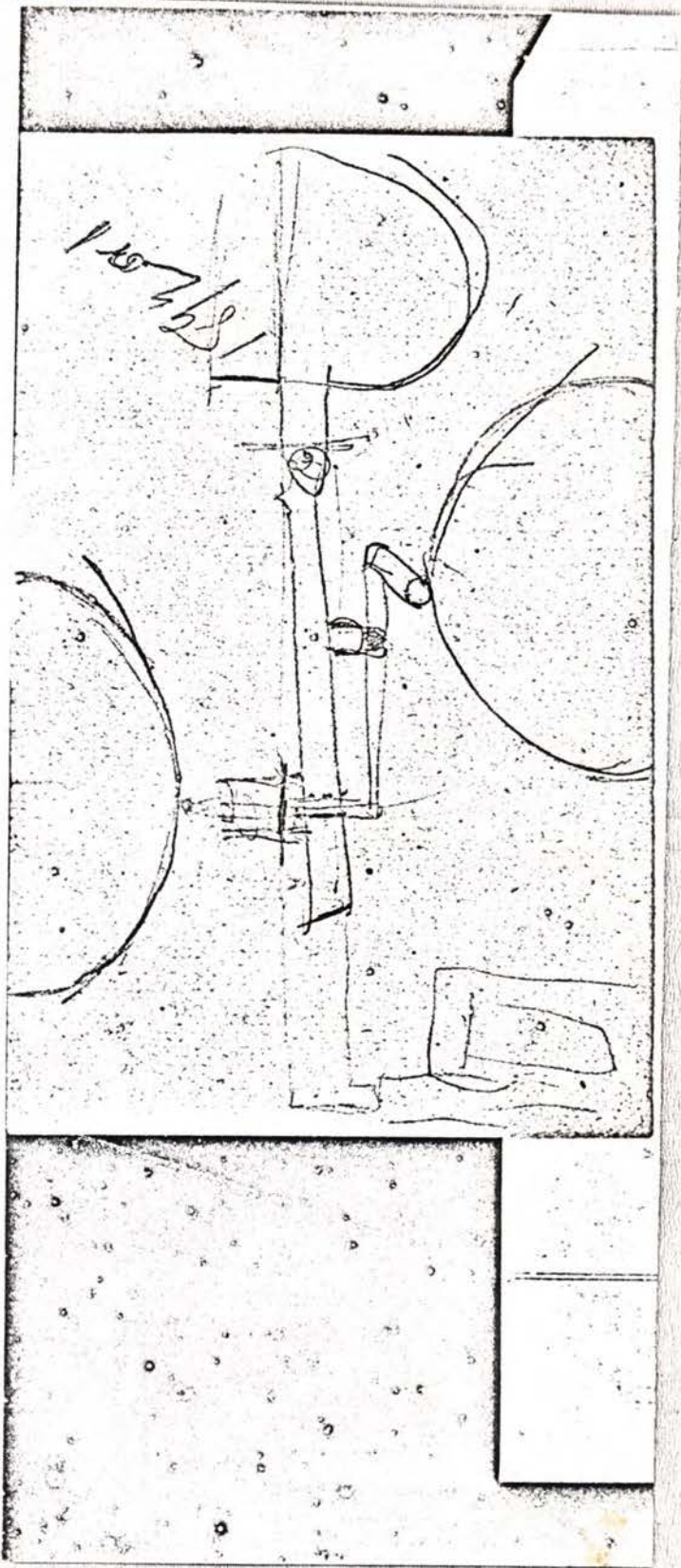
Q Which cylinder does the re-producing ball touch?

A The ball touches on ^{the} one with the record.

Q Which one does the cutting point touch?

A The blank.

Q Have you been sufficiently familiar with the phonograph business to know whether duplicates were gotten out by



Musical Records taken
by Walter Miller

No 427

April 1, 1922 No 609.

One Model Duplication
Machine for Silver Lake

Making Six Duplicating
Machines for Edison Stamp
Co. No 662

persons other than Mr. Edison, and his Companies?

A Do you mean at the present time?

Q No, I mean in 1888 and 1889?

A I never heard of any at that time.

Q If any other person or company had been placing duplicate records on the market, would you probably have heard of it?

A I would.

Q When did you first hear of the American Graphophone Company putting records on the market?

A I could not say.

CROSS EXAMINATION. By Mr. Edmonds.

Q Were you ever in the employ of the North American Phonograph Company?

A Yes, sir.

Q During what period?

A I was in the employ of the North American Phonograph Company, during 1892 and 1893. I am not positive of that, but I know I was with the North American Phonograph Company at the time it went into the hands of a receiver.

Q As I understand you the phonograph which Mr Edison put out or started to put out in 1888, employed the wax cylinder to which you have referred, and which was commonly known as the white wax phonograph cylinder?

A Yes, sir.

Q This was found to be less effective than the since de-

veloped soap blank, and as developed, that soap blank was adopted for machines which were marketed subsequently?

A Yes, sir. What do I understand you to mean by less affected?

Q I said less effective?

Q Oh, yes, sir.

Q In fact from 1887 and 1888 down to the present time the talking machine experimentors have devoted considerable time and attention to the perfection of the material of which the blanks were made, haven't they?

A Not that I know of. I don't know that there has been any change.

Q That is hardly the question. Is it not a fact that the material of the talking machine blank has been the subject of investigation, experiment and development since 1887?

A Yes, sir.

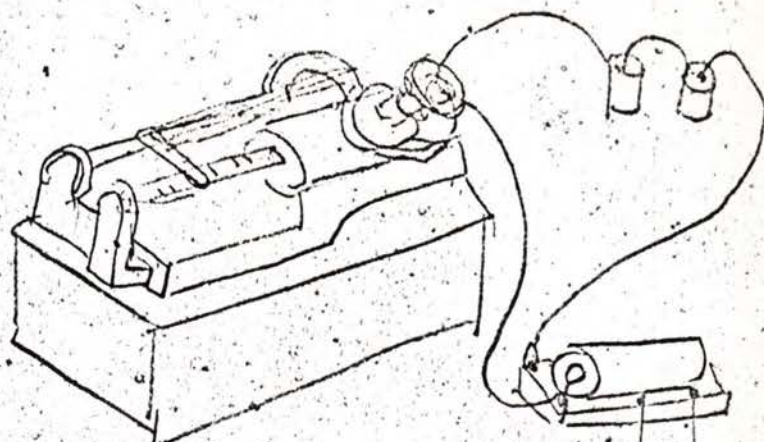
Q And that the talking machine blank of to-day represents the final advance in the arts?

A Yes, sir.

Sworn to and subscribed
before me the 28th day of
November, 1898, at Newark,
N. J.

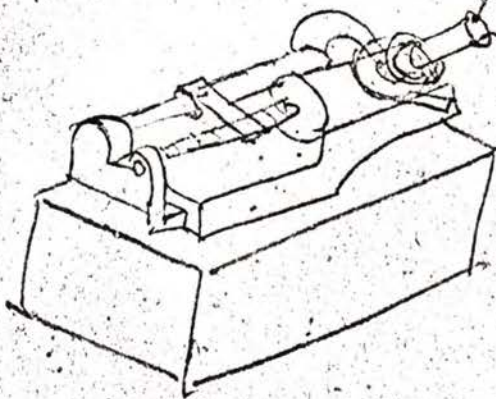
Further examination of witnesses &c., in
this matter stands adjourned.

Boston



Connected by Telephone
this worked in Paris
and at Lenox Lyceum
New York

Philadelphia



IN THE UNITED STATES CIRCUIT COURT,
FOR THE DISTRICT OF NEW JERSEY.

American Graphophone Company)	
)	In Equity
vs.)	
)	(On Patent No. 341,237)
United States Phonograph Company et al.))	

DEPOSITIONS ON BEHALF OF DEFENDANT UNITED STATES PHONOGRAPH CO.

WITNESSES: Gustave M. Gouyard.

Edward H. Amst.

IN THE UNITED STATES CIRCUIT COURT
FOR THE DISTRICT OF NEW JERSEY

American Graphophone Company)
) In Equity
))
) (On Patent No. 341,287)
vs.)
United States Phonograph Company et al.)

TESTIMONY ON BEHALF OF DEFENDANT, UNITED STATES
PHONOGRAPH COMPANY, taken de bene esse in accordance with the
provisions of the Revised Statutes, and by consent of Counsel
for Complainant, before Isabel A. Helmich, a Notary Public in
and for the State of Illinois, at the offices of Messrs. Monk
& Elliott, Chamber of Commerce Building, Chicago, Illinois,
beginning at eleven o'clock A. M., on November 30, 1898.

PRESENT: Francke C. Elliott, Esq., on behalf of Defen-
dant United States Phonograph Company.

S. O. Edmonds, Esq., on behalf of Complainant.

It is stipulated between Counsel that the
testimony of the witnesses shall be taken stenograph-
ically by the Notary Public and transcribed, and
that the signatures of the witnesses are waived.

G U S T A V E M. G O U Y A R D ,

A witness produced and sworn on behalf of Defendant United States Phonograph Company, testified as follows, in answer to interrogatories propounded by FRANCKE C. ELLIOTT, ESQ., Counsel for said Defendant:

Q 1. State your name, age, residence and occupation.

A Gustave M. Gouyard; 1752 Curtis St., Denver, Colorado; I am a Metallurgist and Mining Engineer.

Q 2. Have you had any experience in making sound records from phonographs?

A In 1888 and 1889, as near as I can remember, I made experiments in that line, for Mr. Thomas Edison, at his laboratory in New Jersey.

Q 3. Have you had any experience in duplicating records?

A That is all I have worked on.

Q 4. Have you examined the specification and drawings of Patent No. 341,287, issued to Sumner Tainter in May, 1886, so far as the illustrations Nos. 1 to 3, inclusive, are concerned?

A Yes.

Q 5. State, in view of your experience, whether or not the machine shown by the drawings and described in the specification is a practical operative machine for making du-

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plicate records, in your opinion.

A In my opinion, when you make a wax record, one face, the surface, has got to be turned true. Wax, like all material, is subject to the laws of expansion and contraction, but in the softer material the molecules are not all in the same state of equilibrium in an object which has been turned on one face, on one side, for this reason, that turning or shaving off the face, the material being more or less porous, produces another state of equilibrium for the molecules that are on the side which has been shaved, different from the molecules which are in the body of the object turned; this being due to the fact that the surface that has been turned is not so porous as the interior of the material, the pores having been more or less filled by the action of the pressure. Consequently, when you cut a record on that turned face, you destroy the equilibrium of those surface molecules and produce a new state, a new surface; consequently the first surface is not true any more, it has been disturbed by the new surface cut into the object.

That is all I have got to say on that, except this: When you make an electrolytic deposition on that record, as I understand is Mr. Tainter's way of reproducing, the record not being true, the electrolytic deposition is not true, and when that electrolytic record is put on the machine, Fig. 1, I claim that the spiral lines are not parallel with the thread of the screw 217 which moves the recording knife forward and

Furthermore, Mr. Tainter claims that that electrolytic deposition is backed by plaster-of-Paris, or some other adhering material, and I believe that all engineers will back me in saying that it would be an impossibility, the electrolytic disc not being true, to put it true on the machine by such means. But, supposing that it is as true as possible, it is well known that electrolytic copper is porous, very soft, and subject, with very little resistance, to friction, and that, using a rounded or smooth stylus, rubbing over it, would destroy the indentations on said electrolytic plate. This is of course true only insofar as that friction has more or less pressure. In the machine described in Fig. No. 1 of Mr. Tainter's patent, we have, on the opposite side to the copper disc, an iron disc, into which it is intended to cut a record. The recording knife is to all intents one solid bar, the spring 215 being used to bring the two parts together. The iron surface, as everybody well knows, is much harder than ordinary copper, and much more so than electrolytic copper, which is the softest form of copper, and to cut in a harder surface at a right angle to the knife will necessarily produce a pressure heavy in proportion to the depth of the indentations to be cut in the iron plate, and will tend to mash or rub or burnish the copper master. That is the second point.

As to the claim of Mr. Tainter, if it was found that a satisfactory record could not be cut at one operation on the

iron plate, that a second operation could be made, I would state, as the spiral lines on the copper plate were not parallel with the thread of the screw, that, after the lines on the copper plate had been burnished by the first operation, they would be still less so, and it would be a practical impossibility to run over again with the stylus and catch the same indentations on the steel plate.

Q 6. In the machine described in the specification and shown in the drawings of Patent No. 341,237, in suit, the cutting point is placed at right angles with the disc. What would be the effect of that?

A The effect of that, as the knife appears by the construction of the machine to be perfectly rigid, I don't think that in cutting it would what we call "chatter" or produce vibration, but, not being at right angles, it will not cut what is called "clean", but will scrape and produce what I spoke of before, a harder pressure upon the copper disc, being the result of the knife not cutting easily.

Q 7. How is the knife usually set on reproducing machines?

A Why, we set them at an angle which I do not recollect perfectly--between forty and fifty degrees.

Q 8. Have you ever seen any practical recording machine for duplicating or making original records, in which the knife or recording tool was mounted on a sliding bearing,

as it is in this case?

A No.

Q 9. How are they usually mounted in practical working machines?

A That I do not know.

Q 10. What would be the effect if, instead of the copper master record used there, a record were used made of wax or paraffine, or any of the modern compounds used in phonographs, the blank being of the same material?

A The two surfaces being of the same material, the inference would be that the master would not be spoilt to any great extent; but as the knife is mounted, the work being on the recording knife and the tendency of the knife being to be pushed away from the plate on which the record is being cut, it would, as in the case of the iron and copper disc, spoil the master, as the rubbing of the rounded stylus would destroy the fine indentations on the master.

Q 11. If, in place of the disc-shaped master and blank, a cylinder were substituted, formed of wax or paraffine, or any of the modern compounds, would the process of electrotyping spoken of in the patent be practical?

A That could not be done, because the record would be on the interior of the electrotpe.

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CROSS-EXAMINATION by S. O. EDMONDS, ESQ., Counsel
for Complainant.

X Q 12. When did you first see this patent No.
341,287?

A I saw it first on the 19th day of November, 1898.
Mr. Ott handed it to me.

X Q 13. With whom have you talked concerning the
subject matter of this deposition?

A With Mr. Ott.

X Q 14. Mr. Simon S. Ott of Topeka, who is inter-
ested in the United States Phonograph Company?

A Yes.

X Q 15. And he told you that he wanted you to
testify on this question of the operativeness of this machine?

A Yes.

X Q 16. And did he point out the respects in which
the machine was claimed to be inoperative, and ask your opinion
as to whether they were or were not inoperative?

A No; that is, he left the papers with me from the
19th to the 21st. He asked me, when he gave them to me, if I
would look them over and give him my opinion of the machine in a
couple of days,--there was a Sunday between,--and on the 21st I
saw him again, and then I told him what I thought of the ma-
chine, which is substantially what I have stated before.

X Q 17. I suppose you never saw a machine constructed in accordance with Figs. 1, 2 and 3 of the patent?

A No, sir; I don't believe any machine like that has ever been built.

X Q 18. You mean by that simply that you never saw one?

A I never saw one.

X Q 19. And since the 19th of this month you have not made any experiments with mechanism of the sort disclosed in those figures, as a basis for your opinion?

A No, sir.

X Q 20. You never saw a disc machine either, for reproducing or for duplicating, did you?

A No, sir.

X Q 21. You never saw a machine using a metallic sound record, did you?

A No, sir.

X Q 22. You have done no work in the talking machine art for the last nine or ten years, have you?

A No, sir; I have not; since I have left Mr. Edison's laboratory, I have not done anything on those lines. I was employed there for a year and a half to two years.

Signature waived.

E D W A R D H. A M E T ,

A witness produced and sworn on behalf of Defendant United States Phonograph Company, testified as follows, in answer to interrogatories propounded by FRANK C. ELLIOTT, ESQ., Counsel for said Defendant:

Q 23. Please state your name, age, residence and occupation.

A Edward H. Amet; Waukegan, Lake County, Illinois; Electrical Engineer and Mechanical Expert.

Q 24. What experience, if any, have you had in making sound records on phonographs or talking machines?

A During the World's Fair fall I began experimenting with the phonograph for duplicating records, and I designed one that is in use, that is used by the Chicago Talking Machine Co., and have two patents on different designs of duplicating machines.

Q 25. Ever since that time, have you followed that occupation?

A Well, I invented that echo-phone, the phonograph with the glass rod for transmitting, and of course the spring motor for phonographs, I was the first one to put that on the market; and I might say I gave three years consecutive work to the phonograph instrument.

Q 26. And you are in that business now?

A No, I am not in the business now.

Q 27. Have you examined the specification and the drawings Figs. 1, 2 and 3 of U. S. Patent No. 341,287, issued to Sumner Tainter in May, 1886?

A Yes, sir.

Q 28. State from your experience whether the machine represented therein is a practical operative machine for duplicating records.

A It is not.

Q 29. Give your reasons.

A Why, the first reason is that there is too much friction in it. It cannot reciprocate and act as freely as necessary to make a record, even though the point following the master were capable of actuating the recording point. The record is composed, as we all know, of the little indentations and the raised surfaces,--hills and valleys, I call them,--and that is made with a sharp instrument, a cutting instrument. Now, to reproduce that, you use a round point instrument, so it will not cut and tear. That of necessity is larger than the point that made the record, and consequently cannot enter as deeply, so, even if there was this absence of friction that is necessary in a successful duplicating machine, the stylus, the cutting point, would not be urged back and forth as far as the original at any event, for the simple reason that the point that follows the master could not reproduce a faithful copy on

the opposite plate; then, if you apply force enough to make it follow, or try to make it follow deeply, it must act so very rapidly, as the points are so near together in various instances, that it would simply tear the points right up.

Q 30. How is the master record made under this specification, as used in this machine?

A Why, the master record there, as I understand, was made in wax, and then electrotyped either in copper or iron. I did not have the specification but for a very short time, and did not go into that part of it. I simply looked at the mechanical part, and I had to send the papers to Mr. Douglas. I read that casually, and I gave the drawings thorough attention for the purpose of seeing whether they would duplicate or not.

Q 31. The specification shows that their method of making the master record is to make an electrotype from it of copper, back that up with plaster-of-Paris, and insert that disc in the machine; that is the master record. The other disc is described as made of iron upon which the record is to be transcribed.

A Yes, sir.

Q 32. From your experience, could a master record be made in that way which would be true so that you could transfer the indentations, etc., from that to the blank disc?

A Yes, you could obtain a master in copper that would be a faithful reproduction of the wax, but the reproducing of that record would be accompanied by so much noise and grind from the surface of the copper, understand, that it would not be a commercial record at all; even though you took the same copper electrotpe and used it as a master and forced it into a wax blank, why it would not be a perfect record.

Q 33. Now, in this cut (indicating) it shows this cutting tool as resting against the master record on one side and the blank record on the other. What effect would that have, the blank record being of iron and the master record being of copper?

A Why, the reproducing point would tear right along through the copper; the indentations on the iron would not be noticed; of course, once in a while it would come to a deep indentation and might make a little scratch, but the friction in the bearing is so great that the pressure at right angles binds it so it would not give a longitudinal movement if you wanted it to. Assume the following stylus to be a lathe tool set at right angles, as in the drawing, Fig. 1. Were it free to move as is shown in said figure, the result, if the plate were perfectly smooth, would be a succession of chatter marks, which is caused by the tool vibrating, understand. If it were rigidly held, the action would then be a scratch. The plate to receive the copy as shown in this drawing would of necessity

prevent longitudinal movement of the following stylus, consequently it would be, as in the lathe illustration, held rigid, and its tendency would be to remove all the indentations and reduce the surface of the master record to a smooth plate, through a burnishing movement. That is all I have got to say about that; it simply cannot work.

Q 34. Would it make any difference if, instead of using for the disc master record and the blank as described in the specification,--the master record and blank were made of the other materials used in phonograph records, paraffine, wax, or soap compound?

A Not a particle; there would be the same action. Leaving out all error in the plates being parallel throughout their whole surface, it would not work if they were absolutely true as regards their distance from all points.

Q 35. In the preparation of the master record and of the blank, could a perfectly true blank and master record be made, taking into account expansion and contraction?

A The expansion and contraction would not cut so much figure as the original preparation of it. The discs are large, and there is a certain amount of springage, even if they were ground in metal, that would almost be impossible to overcome. It is possible to make two discs almost perfect, at least so that any error would not count in a duplicating machine.

Q 36 Now, at 215 here in the drawing, is shown a spring designed to keep in combination the sliding recording and reproducing tool in contact with the master. Would, in your opinion, such a spring control the system of tools so as to be operative?

A It would not, because the vibration received on the end of the spring would, where the impact is so light, be more than destroyed in overcoming the inertia of the plunger.

Q 37. Now, this cutting tool is set at a right angle with the surface of the blank. How does that compare with the angle of cutting tools in other duplicating machines?

A Why, it does not compare at all, as there are no engraving or cutting tools set at right angles without the necessary rake or angle to the cutting point of the tool to allow of the cutting tool clearing itself and not being forced to drag through the metal or material.

Q 38. Have you seen any practical recording machines for duplicating or making original records in which the knife or recording tool is mounted on sliding bearings such as described in this patent?

A No, sir.

Q 39. How are they mounted in practical working machines of this character?

A They are generally mounted so that a small weight, free to move, holds the reproducing stylus and cutting stylus.

with a uniform pressure on the blanks, whether the master record and the blank run absolutely true or not.

Q 40. Could, in your opinion, any device be operative to make a faithful duplicate sound record, in which the cutting tool had to slide up and down in sliding bearings, like the tool described in this patent?

A No, sir.

Q 41. The specification here shows that if the lines are not cut deep enough in the first operation, you can go over the work again and cut them out deeper. State whether or not, in your opinion, based upon your experience, that could be done.

A It could not be done, because the master record would be so altered that it would be impossible to obtain the same series of indentations again.

I don't know whether I have answered your question fully or not, but it would be possible, with suitable adjustments, to enter the points at a given point again and start them and have them follow once more around the disc, were it not for the fact I have just mentioned, the master would have been destroyed, assuming that the threads are $2/100$ of an inch apart.

CROSS-EXAMINATION, by S. O. EDMONDS, ESQ., Counsel
for Complainant.

X Q 42. Did you ever see a machine made in accordance with Figs. 1, 2 and 3 of the patent before you?

A No, sir.

X Q 43. Did you ever see a talking machine employing discs for the record?

A Yes.

X Q 44. What was that?

A One that I made myself.

X Q 45. You never tried to make a duplicate with it, did you?

A No.

X Q 46. Did you ever make a record in metal?

A In tin foil.

X Q 47. Did you ever cut a record in metal?

A No, sir.

X Q 48. Did you ever make an electrotpe from a record?

A Only from tin foil records.

X Q 49. Not from a cut record?

A Never from wax or cut records.

X Q 50. You have mentioned in your direct examination that you invented the so-called echo-phone. It is a fact, is it not, that you are now under injunction against

making, using and selling the echo-phone, which injunction was granted in a suit brought against you by this Complainant, the American Graphophone Company?

A Yes, such was the case when Judge Grosscup gave that decision, and the reason he gave it, no infringement as to parts of machine; but even though I bought the records of the Graphophone Company and paid them their price, I could not use their records on my machine.

Signature waived.

State of Illinois)

County of Cook)ss.
)

I hereby certify that the above witnesses, Gustave M. Gouyard and Edward H. Anet, were by me first duly sworn to testify the truth, the whole truth, and nothing but the truth; that their depositions were taken by me stenographically, in pursuance of the stipulation hereinbefore set forth, and afterwards typewritten by me; that said depositions were taken pursuant to consent of counsel for said Complainant, at the offices of Messrs. Monk & Elliott, Chamber of Commerce Building, Chicago, Illinois, beginning at 11:00 o'clock A. M. on November 30, 1898, and were closed on said day; that the parties were represented at the taking of said depositions, by their respective counsel, as set forth; and that I am not counsel or a relative of either party, or otherwise interested in the event of this suit.

In Testimony Whereof I have hereunto set my hand and Notarial seal, the 1st day of December, 1898.

(Signed) ISABEL A. HELMICH

- Notary Public -

(SEAL)

UNITED STATES CIRCUIT COURT

DISTRICT OF NEW JERSEY.

AMERICAN PHONOGRAPH COMPANY :

-VS-

: IN EQUITY.

UNITED STATES PHONOGRAPH COM- :

: Patent 341,287

PANY & al. :

TESTIMONY ON BEHALF OF THE DEFENDANT, UNITED STATES PHONOGRAPH COMPANY, TAKEN BEFORE S.D. OLIPHANT, ESQ., STANDING EXAMINER, ON THIS TWELFTH DAY OF DECEMBER, 1898, AT 11:15 O'CLOCK IN THE FORENOON, AT THE OFFICE OF WILLIAM B. VANSIZE, ESQ., 253 BROADWAY, NEWYORK CITY, PURSUANT TO NOTICE.

Appearances:

HOWARD W. HAYES, ESQ.,
on behalf of Defendant,
United States Phonograph Company.

S.O. EDMONDS, ESQ.,
on behalf of Complainant.

UNITED STATES CIRCUIT COURT

DISTRICT OF NEW JERSEY

THE AMERICAN GRAPHOPHONE COMPANY

-vs-

THE UNITED STATES PHONOGRAPH CO. ET AL.

)
:
)
:
) IN EQUITY.
: Patent 541,237.
)
:

TESTIMONY on behalf of the defendant, United States Phonograph Company, taken before S. H. Oliphant, Esq., Standing Examiner, on this 12th day of December 1898, at 11.15 o'clock in the forenoon at the office of William B. Vansize, Esq., No. 253 Broadway, New York City, pursuant to notice.

Appearances:

Howard W. Hayes, Esq.,
on behalf of the defendant,
United States Phonograph Co.,
S. O. Edmonds, Esq.,
on behalf of the complainant

subpoenaed and

CHARLES BATCHELOR, a witness produced on behalf of defendant, United States Phonograph Co., being duly sworn, deposes as follows:

Q.1. Please state your age, and residence?

A. Charles Batchelor, 33 West 25th St., New York City; age 52.

Q.2. When did you first become connected with Thomas

A. Edison?

A. To the best of my recollection in the spring of 1870.

Q.3. Were you in his employ, and what was the nature of the work you did with him?

A. For a few years I worked for him as a mechanic in his shop; afterwards I superintended his work and later still I was interested with him as a partner in his inventions, up to about the spring of 1890. I am interested with him and I ~~xxxx~~ have always been up to the present time.

Q.4. During this perior was there any time during which you were not working with him in this country?

A. There were a number of times that I was actively engaged away from the laboratory in putting his inventions into commercial use.

Q.5. Did you go abroad in connection with these inventions, and if so when, and for how long?

A Yes, sir; I went abroad in 1881 to exhibit all his inventions in Paris, and staid there until 1884 building up the facotrias and introducing the system of eletric lighting which he had invented

Q.6. Were you working with him in his laboratory from 1875 until you went abroad in 1881?

A. Yes, sir;

Q.7. When was the principle of the phonograph first discovered by him, and where?

A. I cannot recall the exact date, but I have testified before as to it, but the best of my recollection, it was ~~in~~ late in the fall of 1876 and at Menlo Parl, New Jersey.

Q.8. After this discovery by him, did he continue to work on the phonograph and did you assist in thise experiments and if so, for how long?

A I have never known the time since then when Edison had not some experiments going on the phonograph.

When I have been in the laboratory I have assisted at a great many, but not at all.

Q.9. Were you familiar with the experiments in regard to the phonograph that Mr. Edison made between his first invention and 1881, when you went abroad?

A. Yes, sir; very familiar with everything that was going on in the laboratory at that time as I had to oversee the manufacture of it.

Q.10. Did Mr. Edison discuss with you the various experiments in connection with the phonograph that he was making during these years between 1877 and 1881?

A. Yes, sir; he discussed them very fully.

Q.11. During these discussions during those years, did the subject of making copies or duplicates of phonograph records mechanically ever come up?

A. Yes, sir; very often.

Q.11. Please state as fully as you can the substance of these discussions between you and Mr. Edison?

A. They were discussions of what we should do to make money out of the phonograph in the future, and amongst other uses he frequently talked to me of a duplicating machine that should automatically reproduce from a backed-up tin foil from the phonograph a duplicate that could be sold cheap to the public. These he always proposed to put on the market very cheaply and he told me at the time that he had a machine that would do that. I know that he had at least one, if not two men, that were working outside of the general work of the laboratory and whom I had nothing to do with. These, I presume, were the ones who made the machines. I understood

from his talks, and from what he had told me, that he had already patented, or was going to patent such a machine.

Answer objected to by complainant's counsel as consisting largely of hearsay to which the witness has added merely his own opinion or conclusion.

Q.12. Did he indicate to you the general mechanism of this machine about which you have spoken?

Objected to as not calling for the best evidence.

A. Yes, sir; he frequently made sketches when speaking of it, which showed me that the machine was the two cylinders with the record on one and that making a record on the other by a lever in between. I think just such a sketch ⁱⁿ is one of the patents about that time.

Q.13. I show you English patent, No. 1644, dated April 24, 1878, and call your attention to sketch labeled Figure 59 on the fourth sheet of the drawings annexed to that patent, and ask you if that is a sketch of the machine about which you have testified?

Objected to as leading, and the exhibition to the witness of the drawing mentioned in the question prior to the memory of the witness being exhausted relative to the construction of the machine in question is further objected to as in effect putting the answer in the mouth of the witness.

A. Yes, sir, that is substantially the same as the machine he described to me about that time.

DIRECT EXAMINATION CLOSED.

NO CROSS-EXAMINATION.

CLEVELAND WALCUTT, a witness subpoenaed and produced on behalf of the defendant United States Phonograph Co., being duly sworn, deposes and says:

Q.1. Please state your name, residence and age?

A. Name, Cleveland Walcutt, residence, 545 West 158th Street, New York City; age, 36.

Q.2. How long have you been connected with the phonograph people?

A. From June 1888 to the present time.
or individual

Q.3. With what company did you become connected with in June 1888?

A. With Jesse H. Lippincott and the North American Phonograph Company.

Q. 4. What connection did Jesse H. Lippincott have with the North American Phonograph Co.?

A. He was the principal organizer and president of the company.

Q.5. What position or positions did you hold in the North American Phonograph Co., and at what dates?

A. I held a clerical position for the first year or so, and after that was secretary of the company until it went into the hands of a receiver in 1894, I think.

Q.6. When did that North American Phonograph Co. begin business?

A. The company was organized in June 1888, and began business immediately.

Q.7. After the company went into the hands of a receiver in what business were you engaged down to the present time?

A. In the business of selling phonographs and supplies and making phonograph records.

Q 8. What was the business ~~at~~ carried on by the North American Phonograph Company from the time of its organization until it went into the hands of a receiver?

A. The company had the exclusive right to purchase phonographs and supplies from the Edison Phonograph Works and to purchase graphophones and supplies from Jesse H. Lippincott, who was the sole licensee of the American Graphophone Company, and they rented or sold these phonographs, and graphophones and supplies to sub-companies, which had been organized for the purpose of placing the machines on the market.

Q.9. Was your work in the North American Phonograph Co. such as to make you familiar with its business?

A. Yes; I was familiar with all the details of its business.

Q.10. For how long did the company continue to sell or rent graphophones?

A. They sold or rented very few graphophones later than 1892 or the beginning of the year 1893.

Q.11. Do you know at what date the relations between the North American Phonograph Company and Jesse H. Lippincott and the American Graphophone Company, under which the North American phonograph Company handled graphophones, terminated, if so, what approximately was that date?

A. About May 1st, 1891, I think. That is the day on which Jesse H. Lippincott made an assignment.

Q.12. Are you familiar with the type of graphophone furnished by the American Graphophone Co. during the early years of the North American Company's business; if so, please describe in a general way its principal features?

A. Yes. It was a machine actuated by treadle power by the user. It used a cylinder consisting of a paper tube thinly coated with a waxy composition. The recorder used in making the record rested on this cylinder by its own weight and used a sharp cutting stylus with a square-edged point similar to a chisel or engraver's tool. The reproducer also rested on the cylinder by its own weight and consisted of a comparatively sharp edged stylus which transmitted the vibrations to the diaphragm by means of a silk thread.

Q.13. Of what were these styluses of the recorder and reproducer made?

A. Apparently of steel.

Q. 14. What attempt, if any, was made by the Phonograph North American ~~Graphophone~~ Co. to put out this type of graphophone and cylinder?

A. The North American Company shipped these machines on rental to the different sub-companies organized throughout the United States. Some objection being made by the different sub companies to paying rental on the machines as they claimed they were imperfect and unsatisfactory and that they could not themselves rent them, the North American Company waived the rental on the machines except on such as the sub companies might themselves be able to ~~rent~~ rent and collect the rental on. On this basis some three thousand

machines were shipped to the sub companies prior to May, 1890. After that time the sub companies returned all of these machines, sending them back from time to time until about January of 1893, at which time they were all returned except perhaps about a dozen or so.

Q.15. How many of these sub companies were there and where were they located?

A. There were about thirty-one sub-companies. Each company as a rule covering one, or perhaps two or three different states of the United States. The principal offices being located somewhere in the territory that they owned.

Q.16. Were phonographs manufactured at the Edison Phonograph works also put out to the sub companies at the same time that the graphophones were, and if so, with what result?

A. Yes; and resulted in a constantly increasing number of phonographs being sent out which eventually amounted to seven or eight thousand.

Q.17. What was the method pursued by the sub companies in regard to presenting these two machines to the public?

A. The contracts between the North American Phonograph Company and Jesse H. Lippincott and the Edison Phonograph Works and also the contract between the different sub companies and the North American Phonograph Company provided that the phonograph and the graphophone should be presented impartially to the public and that neither machine should be given any preference in the endeavor to introduce them. I believe, from my intercourse with the parties controlling

the sub companies that this provision of the contract was complied with.

Q.18. What was done with these graphophones when they were first sent back by the sub companies?

A. They were sent to the factory of the American Graphophone Co. at Bridgeport, Connecticut, and destroyed there.

Q.19. Do you know whether any correspondence or consultations took place between the officers of the North American Phonograph Company and the officers of the American Graphophone Company with regard to these machines being sent back? If so, state what you know about them?

A. These machines were returned by the different sub companies with the general complaint that they were not serviceable and not acceptable to the public, and these complaints were stated by the North American Phonograph Company to the American Graphophone company through Jesse H. Lippincott from time to time, which resulted in the American Graphophone Company endeavoring to overcome the objections by making improved types of machines. In this way three different types of machines were put out prior to May 1890, called respectively Type A, Type B, and Type C. They all, however, used the same form of cylinder, which was the principal cause of objection from the sub companies, and were about all returned by January 1893, as stated before..

Q.20. Please state more fully the specific objections which were made to the machines by the sub companies and the public?

A. The sub-companies notified us that their customers complained that the cylinders were too easily affected by the temperature; that they grew too soft to be serviceable in warm weather, and so hard that they cracked in cold weather; also that the records, even when made under good circumstances, could not be easily understood when they were reproduced, one of the principal reasons being the inability of the machines to record the s sounds in the words.

Q.21. Do you remember an employee of the North American Phonograph Company named Alfred Clark?

A. I do.

Q.22. Do you remember his being sent to the factory of the American Graphophone Company at Bridgeport to inspect some graphophones there? If so, state, if you can, the circumstances under which and the purposes for which he was sent?

A. Some time in 1892, after Mr. Lippincott had discontinued business with the American Graphophone Company, the American Graphophone Company notified the North American Phonograph Company that there were a number of graphophones at their Bridgeport factory, which they understood belonged to the North American phonograph Co. and asked that the North American phonograph company pay them an amount claimed for storage and remove them. They said ~~that the storage upon the machines amounted to about five thousand dollars, but that they could not tell the exact amount until the machines had been counted and suggested that the North American Phonograph Company send a~~

representative to Bridgeport to verify the count, and that if the North American Company paid the estimated amount of five thousand dollars for storage the amount could be corrected according to the count taken and the balance either paid by the North American Phonograph Company or returned by the American Graphophone Company in accordance. This plan was agreeable to the North American Phonograph Company; the five thousand dollars for storage was paid, and Mr. Clark and an assistant, I believe a Mr. Alison, went to Bridgeport to count the machines. After this was done, it showed a further amount of several hundred dollars to be due for storage by the North American Phonograph Company, which was also paid, and the machines were removed to the factory of the Edison Phonograph Works at Orange. The number was about three thousand machines which had been shipped out to sub companies and returned and some other machines which had never been shipped out. I don't remember the exact number.

Q.23. Do you know what eventually became of these graphophones which were sent up to the factory of the Edison Phonograph Works at Orange; if so, what?

A. They remained there up to the time that the North American Phonograph Company went into the hands of a receiver, what became of them afterwards I do not know.

Q.24. Has there been any attempt since these machines were returned to put on the market graphophones of those types?

A. I don't know what attempts have been made, but if any, they have not been successful.

Q.25. How was the cylinder on those types of machines held on the machines while in use?

A. The cylinder was held by a chuck at each of its ends.

Recess for luncheon.

Q.26. Please describe the essential features of the phonograph which was put out successfully, including the form and material of the cylinder, the method of holding it on the machine when in use, the recording stylus and the reproducing stylus, and the methods of connecting them with the diaphragm and the mechanism used to make allowance for the eccentricity of the cylinders and any inaccuracy of adjustment?

A. The cylinder used on the phonograph was a cylinder composed of what is known as metallic soap. The cylinder consisted entirely of this composition, made thick and heavy enough to be self-supporting, and also thick enough to allow the record to be obliterated or removed by paring off the surface of the cylinder. This could be done from fifty to one hundred times before the cylinder was too thin for use. The inside of the cylinder was made tapering so that when placed on the mandrel of the phonograph, which had a corresponding taper, it fitted snugly and was forced to a central position. The recorder of the phonograph consisted of a cylindrical cutting stylus which was set at an angle to the ~~xxx~~ blank cylinder so that the cutting was done by one end of the cylindrical knife cutting a concave rounded groove. This cutting stylus was set in a movable arm, pivoted at its center to a weight hinged at one end so that the vertical

movement of the weight pressed the arm containing the stylus down until the stylus came in contact with the cylinder no matter how thick or thin the cylinder might be, and kept the stylus in contact with the cylinder even though warped out of shape or not true to the machine. The end of the arm opposite to the stylus beyond the pivoting point was connected by a small link to the glass diaphragm. In this way the quick sound vibrations of the diaphragm were carried to the recording stylus and engraved in the wax and were not affected by the vertical movement which the weight had as the inertia of the weight prevented it from moving with the quick vibrations given to the diaphragm by the sound waves. The diaphragm itself remained stationary in one position. The reproducer was exactly the same as the recording diaphragm except that it was divided with a stylus having a round ball-shaped end to fit the groove made by the recorder. In fact, the recorder and reproducer were one article, the arm being provided with both a recording stylus and a reproducing stylus either of which could be brought into contact with the cylinder at will.

Q.27. Were reproducing diaphragms made and sold by themselves, not containing a device for cutting?

A. The first machines made, ~~xxx~~ I think up to about ~~xxxxxxx~~ 1893, were provided only with the combination recorder and reproducer, commonly called the "standard speaker". After that time a diaphragm for reproducing only was made, commonly called the "automatic reproducer", which was provided only with a reproducing ball and so made by a

little looseness in the joint of the weight that the ~~stylus~~ stylus could move from side to side slightly and keep in the groove of the record more easily.

Q.28. Of what substance were the cutting and reproducing styluses made?

A. The first few machines sent out in 1888 had recording and reproducing styluses made of steel, but after a short time they were made of sapphire and continued to be so made up to the present time.

Q.29. Are you familiar with the substances of which the lead soap cylinder was made. If so, please state them?

A. The lead soap cylinder is made of stearic acid, acetate of aluminum, caustic potash and ozokerite.

Q.30. How did you ascertain this fact?

A. Originally from a Mr. J.C. English who had been engaged at the Edison Phonograph Works as superintendent, and later by actual experience in making the blanks.

Q.31. Were you at the World's Fair in Chicago in 1893?

A. I was not.

Q.32. Have you any information as to a nickel slot device used at the World's Fair in connection with graphophones. If so, please state your information and its source and the sort of record and reproducing device used on that machine?

A. The North American Phonograph Company received a machine sent to them by their Chicago Branch office

said to be the same as others used at the World's Fair. It was a graphophone with one of the Edison phonograph automatic reproducers fitted to it in place of the graphophone reproducer, and provided with a working mandrel tapered the same as the phonograph mandrel and of the same size, so that an Edison cylinder could be placed on it. The mandrel was made so that it could be adjusted between the chucks of the graphophone and the record on the cylinder reproduced by means of the automatic phonograph reproducer which had been adjusted to the machine.

Q.33. Are you familiar with the types of graphophones that have been manufactured and put out by the American Graphophone Company in the year 1893 and since then up to the present time?

A. Yes.

Q.34. Please describe the essential features of those machines, including the form and material of the cylinders, the method by which a cylinder is held in place while in use, and the recording and reproducing devices?

A. The first new type of machine, after those purchased by the North American Phonograph Company, was called the "Baby Grand Graphophone", and I think was made in 1893. It was similar to the earlier types and was made to use the same kind of cylinder or to use a tapering phonograph-shape mandrel, which could be adjusted between the chucks, the same as had been done with the machines used at the World's Fair, and such a mandrel was provided and sold with the machines. The form of the recorder and reproducer was modified so that in each a glass was used of about the same size as in the

phonograph, The recording or reproducing stylus was set in a holder that was ~~xxxxxx~~ cemented to the center of the glass, and the recorder or reproducer was allowed to rest on the cylinder by the pressure of its own weight. ~~Thaxxxx~~
~~xxpx~~ This machine was actuated either by an electric or a spring motor instead of the treadle motor. The next type came out in 1894 or 1895 and was called the "Bijou". It was provided with the same recorder and reproducer as I have described as used with the Baby Grand; the chucks, however, for holding the old style coated paper cylinder were done away with and the machine was fitted with a permanent tapering mandrel of the size of a phonograph mandrel to accommodate the Edison cylinder, such as used on the phonograph. The next type, which came out about a year later, was called the "Columbia Graphophone", and was provided with the same mandrel to take the phonograph cylinder and used the same recorder and reproducer and differed only from the Bijou in some details of construction. The next machine and last, which has been put out by the Graphophone Company is called the "Eagle Graphophone" and is similar to the Columbia Graphophone except that it is made more cheaply. The Bijou, Columbia and Eagle, are all made either with spring or electric motors. The styluses used on the Eagle, Columbia, Bijou, and, I think, the Baby Grand, both for recording and reproducing are made of sapphire as a rule and are practically the same in shape as those used on the phonograph.

Q.35. What other material besides sapphire are these recording and reproducing styluses made of by the

American Graphophone Company?

A. I believe that they have made some reproducing styluses with glass.

Q.36. What, if any, is the advantage of the sapphire recorder and reproducer over the old steel kind?

A. For recording the sapphire holds its edge longer and makes a cleaner and smoother cut. For reproducing, the sapphire preserves the smoothness of the surface and wears it out less than any other known material.

Q.37. What is the advantage, if any, of the cylindrical shaped cutting stylus over a chisel-shaped cutting stylus?

A. It cuts a cleaner groove and the wax cut out frees itself more readily.

Q.38. What is the advantage, if any, of the ball-shaped reproducing stylus over a flat pointed stylus?

A. The ball fits perfectly into the groove cut by the cylindrical cutting stylus, distributing the pressure of its surface over the entire groove which prevents wear to the record.

Q.39. What character of blank cylinders ~~are~~ are the Graphophone Company now putting out, and for how long have they put out cylinders of that character? Describe their shape and the material of which they are made, so far as you can tell?

A. They are the same as I described as put out with the phonograph ever since 1888, except that I believe they put out a comparatively small number of cylinders for use

on the old style of machine provided with chucks instead of the tapering mandrel. These cylinders consist of a paper tube surrounded by a thick layer of wax which, so far as can be seen, is of the same material as that used in the phonograph type of cylinder. The machines they are used on are all in use for dictating and transcribing correspondence or similar work, and this particular cylinder is designed to be shaved off a great number of times.

Q.40. How early did the American Graphophone Company put out such cylinder similar in shape to that put out with the phonograph?

A. The machines made for the World's Fair provided with the adjustable phonograph-shaped mandrel and the Baby Grand machine were designed to use the regular phonograph cylinders. Some time during the latter part of 1894 the Graphophone Company themselves began to manufacture a cylinder in imitation of the phonograph cylinders.

Q.41. How closely did this cylinder described in your last answer resemble the phonograph cylinder in shape and in substance?

A. In shape it was the same; in substance it was very similar and in use gave very much the same result. The most noticeable difference was that these cylinders developed a bluish mold on the surface.

Q.42. From what is your knowledge or opinion as to what substance these cylinders were made of, derived?

A. Only from their appearance and the apparent texture and the result from using them.

Q.43. About when did the American Graphophone Company put out the cylinder for their commercial machine which cylinder you have described as consisting of a paper tube having on it a thick layer of soap?

A. I think during 1894 or 1895.

Q.44. How thick is this soap layer approximately?

A. About half an inch.

Q.45. How thick is the regular phonograph cylinder?

A. About a quarter of an inch at the small end of the taper and about three-sixteenths of an inch at the large end of the taper.

Q.46. I notice that in speaking of the soap cylinders, you occasionally use the word "wax". In what sense is that word used by you and commonly in phonograph circles in connection with the phonograph and graphophone cylinders?

A. It has been so long since any of the old wax-coated paper cylinders have been used that there is practically only one kind of cylinder known in the phonograph trade, and that is now ordinarily referred to as wax, although the material is of a hard brittle nature and not such as would be commonly described as waxy.

CROSS EXAMINATION BY MR. EDMONDS.

The right of objection having been reserved by consent of counsel, complainant's counsel now makes timely objection to the foregoing deposition as irrelevant and immaterial in whole and as hearsay in part. Objection is further entered to

such part of the deposition as relates to contract relations, correspondence, etc., as incompetent. Without waiving these objections complainant's counsel cross-examines.

XQ 47. You and your partner, Edward F. Leeds, are defendants in an action brought by this complainant for infringement of the Tainter patent 341,237 by making, using or selling duplicate sound records, are you not?

A. Yes.

XQ 48. You and ~~Leeds~~ Mr. Leeds are also defendants in another action brought by this complainant for infringement of the Bell and Tainter patents Nos. 341,214 and 341,236, in which action you are enjoined against making, using or selling duplicate sound records for talking machines?

A. Yes.

XQ 49. In the latter case you and Mr. Leeds were found guilty of contempt of the injunction of the court against making, using or selling infringing duplicate sound records and were ordered to respond in damages or stand committed; is this true?

A. Yes.

XQ 50. You testified as a witness in the suit brought by this complainant against Leeds & Baldwin in the United States Circuit Court for the Southern District of New York, for infringement of Bell and Tainter patent No. 341,214, did you not?

A. Yes.

XQ 51. Your deposition in that case covered substantially the same ground as your foregoing direct examination does in the present case, does it not?

A. I don't remember.

Cross Examination closed.

New York, December 14th, 1890. 10. A.M.

Met pursuant to agreement at the office of the
Columbian Phonograph Co., Broadway
and 26th Street, New York City.

Present, counsel as before.

EBEN G. DODGE, a witness subpoenaed and produced on
behalf of defendants, United States Phonograph Co., being
duly sworn, deposes and says:

Q.1. You were subpoenaed to testify on behalf of
the defendant, United States Phonograph Company?

A. Yes, sir.

Q.2. What is your name, age and residence?

A. Eben G. Dodge; 32 years old; residence, White
Plains, Westchester County, New York.

Q.3. What is your employment at present?

A. I am employed as Manager of the National Phono-
graph Co. in the New York store - the Edison Company.

Q.4. The National Phonograph Company is Mr. Edi-
son's Company?

A. I believe Mr. Edison is interested in it; I
understand so.

Q.5. Please state how long you have been connected
with the talking machine business, and in your answer state
the different employments you have had in connection with
that business and give the dates of each one as near as
you can remember.

A. I was first employed by the American Graphophone
Company in January 1889, as foreman of their cylinder

department, and remained with them until about August of the same year, when I was sent to Paris as a Graphophone expert by the International Company, and remained with them until December of the same year. Early in the Spring of 1890 I was employed by the Eastern Pennsylvania Phonograph Company of Philadelphia as a Graphophone expert and remained with them until the latter part of August of the same year when I was employed by the Edison Phonograph works as an assembler of the phonograph. I remained with them until the latter part of November and was afterwards employed by the ^{New York} National Phonograph Company as a phonograph expert, a position I retained for a short time, and was afterwards made superintendent of the Company. This position I occupied for about two years. I left this Company on or about the 7th of November 1892, to accept a position as a salesman of the American Graphophone Company in Washington. I remained in Washington about a month or six weeks, and was then sent to their factory at Bridgeport, Connecticut to do some experimental work on the recorders and reproducers, and afterwards was sent to New York City to have special sapphire recording and reproducing points made. Early in the Spring of 1893 I was made manager of the branch office of the American Graphophone Company in New York City, and held this position until about the latter part of April or the 1st of May, when I was sent to their factory - The American Graphophone Company's - to take charge of the cylinder work, and I remained there until the Spring of 1894. I was then employed by the North American Phonograph Company as a

salesman until the time when they went into the hands of a receiver, when I accepted the position of Chief Inspector in the Edison Phonograph works, which position I held until November 1897.

Q.6. During the time you were employed by the Eastern Pennsylvania Phonograph Company and the New York Phonograph Company, were you sufficiently familiar with the business of this Company to testify as to what success the Company had in selling or renting graphophones or phonographs?

A. What do you mean by success?

Q.7. I mean as to how successful they were in getting the public to rent or buy the two machines and what degree of success they had in that way with each of the machines?

A. At that time the machines were only rented. Both machines were pushed equally, but the most successful machine was the phonograph.

Q.8. Were either of the Companies able to successfully put out any graphophones?

A. Well, the graphophones were not as successful with the general public as the phonograph owing to the nature of the blank. This soft blank cylinder caused a great deal of trouble.

Q.9. Please describe the character of the blank that was then used on the graphophone?

A. While I was with the Eastern Pennsylvania Phonograph Company, where I had most of my experience with

the early graphophone business, the ozokerite cylinder was used. This was a paper tube coated with ozokerite.

Q. 10. Please state what this substance ozokerite is.

A. It is a mineral wax.

Q. 11. Is it soft or hard?

A. It is a soft wax.

Q. 12. You say you were sent to the Graphophone Company's Bridgeport Factory in 1893, when you were in the employ of that Company to experiment on cylinders. Will you kindly state what those experiments were and what results you arrived at?

A. I was sent to the factory to experiment with the ozokerite or mineral wax cylinders, but it had been my conviction that this cylinder would not prove satisfactory, and after I had worked on the same for probably two months my experiments were devoted to trying to make a metallic soap or hard cylinder. This experimental work was carried on with the factory manager, Mr. T. H. McDonald, for some time, I having taken the experimental work up where he left off.

Q. 13. What was the trouble with the ozokerite cylinder?

A. The trouble with the ozokerite cylinder was that it peeled from the paper tube upon which it was coated, and it was very difficult to filter or cleanse it from impurities, such as lint, particles of dirt, etc., and the material being so soft it was almost impossible to get the 8 sounds except when the machine was used in

the hands of an expert. As an example, the word "specie" would reproduce "peachy". The trouble of peeling was overcome later on by a mixture of about thirty or forty percent of paraffine, which remedied this trouble but did not benefit to any great extent the quality of the cylinder.

Q.14. Did you finally produce for the American Graphophone Company a hard metallic soap cylinder?

A. The first composition was made by Mr. McDonald but was very difficult to mold and very harsh in its qualities and entirely unsatisfactory. From about this time I carried the experimental work on alone and succeeded in making a blank which was almost as good as the Edison cylinder except that it was subject to a blue mould.

Q.15. Was this metallic soap cylinder adopted by the American Graphophone Company, and if so, at what time approximately?

A. I should say the first metallic soap cylinder was made in the early part of September 1893 and was adopted by the Graphophone Company. That is to say, quite a number were made.

Q.16. After they made this metallic soap cylinder, did they discontinue putting out the ozokerite cylinder?

A. I could not answer that question; I do not know.

Q. 17. Can you tell when, if at any time, the use of the ozokerite cylinder in connection with the

graphophone ceased?

A. My understanding is that it ceased about this time, although whether it ceased entirely I am not in a position to say.

Q. 18. Were these soap cylinders made of two types, if so, please state how the two types were distinguished and what the difference in them was?

A. Yes, the cylinders were made in two types, one was called Type P, which was an exact counterpart of the Edison blank and the other was called Type B, which was mounted on a paper tube, was smaller in diameter and longer.

Q.19. At the time you were experimenting on these soap cylinders were you familiar with the patents granted to Mr. Edison for soap cylinders?

A. Yes, I had very carefully read the patents granted to Mr. Edison on phonograph blanks.

Q.20. Did you receive from the United States Phonograph Company any composition to aid in your experiments in making soap cylinders?

Objected to unless the question be limited to the personal knowledge of the witness not only as to purchase but also actual receipt from the United States Phonograph Company of the material in question.

(By Mr. Hayes) The witness will please answer the question stating of course from what source his knowledge is de-

rived?

A. I purchased personally a barrel of broken cylinders from the United States Phonograph Company which I used to aid me in my experimental work on the soap cylinders.

Q.21. From the appearance of the broken cylinders could you judge as to what make of cylinder they were?

A. To the best of my knowledge and belief they were Edison's cylinders. I purchased them with that understanding.

Q.22. About when was that?

A. About the latter part of May or June - the early part of the Summer of 1893.

Q.23. Can you state whether the soap cylinders that you made for the American Graphophone Company were or were not similar in composition to the Edison soap cylinder?

A. Well, the cylinder that I made was a metallic soap and I understand that the Edison blank is the same. The appearance of the material was very much alike, although anyone who was familiar with both blanks could distinguish the difference.

Q.24. What was the material of which the recorder and reproducer of the graphophone was made prior to the use of the soap cylinders?

A. They used almost exclusively the steel cutters or steel recorder and reproducer points.

Q. 25. After the adoption of the soap cylinder, was any change made in the recording and reproducing stylus, and if so, what?

A. Yes, they adopted the so-called Edison cutter, and the ball reproducing point. These points were made of sapphire.

CROSS EXAMINATION BY MR. EDMONDS:

Complainant's Counsel objects to the whole of the foregoing deposition as utterly irrelevant and immaterial and cross examines without waiving this objection.

XQ 26. During the period of your familiarity with the exploitation of both graphophones and phonographs - I refer now to the period during which, as you state, the phonograph proved more successful than the graphophone - the talking machine companies were exploiting the business use of the talking machines, that is, the use for dictation purposes, etc., rather than for amusement; is that correct?

A. That is correct, sir.

XQ 27. On the other hand, at the present day the business use of the talking machine is exceedingly limited, and its chief utility is for ~~the~~ amusement purposes; is not that so?

A. There are a great many more phonographs used for amusement purposes than there are for commercial purposes.

XQ 28. That is true of talking machines generally, is it not?

A. Yes, as far as I know. Of course my personal knowledge is only in connection with the phonograph.

XQ 29. It is true, is it not, that the ozokerite cylinder, first introduced with the graphophone, had certain advantages not shared by the solid cylinder of the phonograph. For instance, the advantages of lightness, adaptability for mailing, cheapness, etc.?

A. The advantage of the graphophone cylinder over the phonograph cylinder, in my opinion, was only for mailing purposes and its weight. As far as the cheapness is concerned the metallic soap blank is considerably cheaper.

XQ 30. As a matter of fact, you know that many thousands of the ozokerite cylinders were made and put in use in connection with the graphophone, do you not?

A. I know that there were a great many of the cylinders used with more or less success, but in the hands of the public they were not used successfully.

XQ 31. Such as were used, were used most largely for business purposes, were they not?

A. Almost entirely.

XQ 32. And since about 1893 or 1894 the exploitation of the graphophone has been on the lines of amusement machines, has it not?

A. I can only say that I understand so, I do not know personally.

XQ 33. You have no reason to doubt that, though?

A. I have no reason to doubt that, no.

RE-DIRECT EXAMINATION BY MR. HAYES.

RDQ 34. In what part of the country was it that the graphophone with the ozokerite cylinder was used for business purposes principally?

A. In Washington.

RDQ 35. And who were the principal users of it there?

A. Well, I am hardly in a position to answer that question. I only answer it from hearsay. The majority of the machines were used at the Capitol.

RDQ 36. And by whom there?

A. Mr. Devine and Mr. White.

RDQ 37. Both Mr. Devine and Mr. White were interested in the Columbia Phonograph Company, were they not?

A. They were interested in the American Graphophone Company; whether they were interested in the Columbia Company, I do not know.

Adjourned until 2 P.M. at the office of W.B.

Vansize.

UNITED STATES CIRCUIT COURT,

District of New Jersey.

THE AMERICAN GRAPHOPHONE COMPANY, :
: IN EQUITY.
-VS- :
: THE UNITED STATES PHONOGRAPH COMPANY.:
:

State of New Jersey:

:ss.

County of Essex :

HOWARD W. HAYES being duly sworn according to law on his oath says: That he is one of the solicitors of the defendant, the United States Phonograph Company, in the above cause, and has actual charge of the management of the suit. The facts in regard to the taking of testimony in the case are these:

After the matter of the preliminary injunction had been disposed of by the plaintiff withdrawing its motion, Mr. Mauro, the solicitor of the complainant, wrote me saying that he presumed that I would assist him in making out the prima facie case by furnishing samples of the article which it was alleged was an infringement, and also a sketch of the machine used for making it. To this I assented and went to Washington the latter part of June, giving him the sketches and exhibits, and stipulating that they were the goods made by the defendant and a sketch of its machine. In return, he agreed that the summer time should not be counted as part of the time in the case, and I agreed that if he wished to add anything to his prima facie case he would have the right

to do so, and I would have the right to cross-examine after I returned from my vacation. I then went abroad and while there did some considerable work in investigating the case, and also went to Frankfurt, Germany, to confer with a man there who was one of the early experimenters in making duplicates of phonograph records. At the end of August the application was made to limit the defendant's time for taking testimony, and it was stated to the court that the complainant's case was closed. The court then made an order limiting the defendant's time *for* taking testimony to two months, with the understanding that if reasonable diligence was shown in working on the case, more time would be granted. I immediately began a preparation of the defence in the case, and gave on an average from two to three days in every week to the matter. I wrote to England to get additional information and made extended inquiries in this country among the different persons who had experimented on making duplicates of phonograph records. I also ordered from Mr. Caps, who is the most expert machinist now in the phonograph business, some experimental machines. These machines were made from sketches in the early patents and were extremely difficult to make, as no models of them were accessible, and they had to be made entirely from the drawing. I also began taking testimony at once and took testimony on _____ days out of *the* forty-three working days of those two months. This testimony was given by _____ witnesses. Considerable delay was occasioned in this by the fact that many of the witnesses were hostile, notably Mr. Edison, and informa-

tion had to be gotten out of them as to each subsequent line of investigation ^{to be} taken up. In that way it was impossible to prepare the case all at once; as each new fact came out it was necessary to get information from a witness as to the next step to be taken in the matter. There was also on one occasion some delay by the inability of a witness to furnish the information requested of him. This was Mr. Easton, the President of the complainant, who was examined as to the names of the officers and directors of the complainant, and the Companies connected with the complainant, but who was unable to furnish the information until days after his testimony was taken. After the time expired I took some more testimony of witnesses, for taking whose testimony arrangement had been made, and then stopped taking any more until I could apply to this court to have the time for taking testimony extended. There was something like a weeks delay in that, from my inability to make an appointment with Judge Kirkpatrick at Newark, at a day convenient for Mr. Edmonds who appeared for the complainant. The sitting of the court of appeals in Philadelphia was, I understand, the reason why Judge Kirkpatrick was not at his Chambers in Newark during that time. When that application was made the time for the defendant to take testimony was extended until the first day of January, 1899. As soon as that order was made I continued taking testimony, and as a great part of the preliminary work had already been done, I was able to take testimony almost continuously down to the present time. I have examined witnesses in Newark, and New

York, and had them examined in Chicago, Topeka and also in California. My inquiries in England received replies about the end of October, and resulted in it being necessary for me to send to France for copies of some patents there. Since the order was made limiting the time, there has been working days, excluding Saturdays, and testimony has been taken during of those days. There also was some little delay on account of the difficulty in getting the machines that were to be used as exhibits. One of those made by Mr. English being a small model of the old Edison phonograph, was delivered to the complainant's expert witness the first part of last week. The two machines that Mr. Caps had been making were not completed until December 24th., and were placed in the hands of Mr. Vansize, the defendant's expert, on December 27th. Mr. Vansize who is the principal expert relied upon by the defendant began his testimony on December 20th., and has been testifying continuously every day since then, including Saturday. His testimony so far has been only in the case on patents 341,214 and 341,288. This testimony, however, can be used in the other case. But in the other case, in addition to this testimony, it will take him several more days to testify on his direct examination. It must be remembered that two cases are being tried at the same time, and while most of the testimony in one case may be used in the other, that other case also has to have an entirely new line of testimony, which is much greater in volume and the time necessary

to take it longer, than testimony in an ordinary patent suit. In the former suit between the same parties on patents 341, 214 and 341,288, printed pages of testimony was taken, and the time consumed by the defendant who were represented by the counsel now representing the complainant, was months. Of course that testimony formerly taken has been of great assistance to me, otherwise I could not have gotten through the testimony I have, in less than three times the time it has taken, but I have gone into new lines on the defence; and the case involving patent 341,287 being entirely a new one, investigations and testimony taken in that have had to be worked out de novo.

It will be impossible for Mr. Vansize to finish his direct examination in the case on patents 341,214 and 341,288 until the end of this week, and the cross-examination will probably take one or two days more. His direct testimony in the other case will take not less than three or four days and probably a week. In addition to that it will be necessary for me to take the testimony of other witnesses, including Mr. Caps, who has made the experimental machines I have already spoken of, and who devised and adopted from the phonograph the duplicating machine of the defendant United States Phonograph Company, which the complainant claims infringes the patents in suit in the two cases. I also expect to subpoena Emil Berliner of Washington, D.C., and have been delayed in that only on account of my time being taken up by other matters in the case. Marvin E. Lyle, one of the

employees of the complainant who gave an affidavit for the complainant on the motion for preliminary injunction, is another necessary witness for said defendant. I understand the complainant is ready to produce him before the examiner as soon as we can agree on a day convenient for the purpose. There has been difficulty in getting from the Patent Office all the patents that are needed to put in evidence, as some of them are out of print. This has also delayed me. These patents are relied on as showing anticipation of the alleged inventions described in the complainant's patents. If the time for taking testimony in both the cases is extended another thirty days I can without doubt finish the cases by that time, and, so far as I can see now, will not need to ask for any further extension. I expect to use every possible diligence to close the cases.

Sworn to and subscribed :
 :
 before me this day :
 :
 of December, A.D., 1898 :
 :
 at Newark, N. J. :

City, County and)
(ss:
State of New York.)

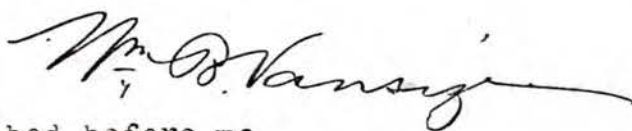
William B. Vansize, being duly sworn according to law on his oath, deposes and says: I am a Patent Attorney and Expert in patent matters. I made an affidavit which was used on the motion for preliminary injunction in the cases entitled, American Graphophone Co. against the United States Phonograph Co., on patents 341,214, and 341,288. I am employed by the defendant, United States Phonograph Co. as an expert in that case, and, also, in the case between the same parties on patent 341,287. Soon after the first order limiting the defendant's time to take testimony was made, Mr. Hayes, counsel for the defendant, United States Phonograph Co. conferred with me in regard to the case and continued conferences have been held by us from that time down to the present day.

I have also been during that time at work on the two cases, examining the patents, and acquainting myself more fully with the condition of the prior art, and learning the facts that have been brought out by the testimony of the various witnesses who have already testified in the two cases. I gave thirty days and parts of days to that work before beginning to testify.

I began giving testimony in the case on patents 341,214 and 341,288 on December 20th, 1898, and continued giving testimony in that case to the present day, testifying all day on each one of those days, excepting

Sunday and Christmas but including Saturday. I have not yet finished giving my direct testimony in that case and probably will not be through until the end of this week. The case is one requiring very extensive investigation and a large mass of testimony. The number of patents and other publications, having a bearing on the validity of the complainant's patents, being very large, I presume the cross examination on my testimony will take at least two days. The testimony I am giving in the case on patents 341,214 and 341,288 bears on the other case on patent 341,287 but a large additional amount of testimony will be needed in that case. In order to entirely complete my testimony, both the direct and cross examinations and re-direct examination will probably take until January 15th, and I understand there is some additional testimony needed in the cases after mine is finished.

The collecting and marking the various exhibits used in connection with my examination will also consume some time. It was impossible for me to begin giving my testimony before the time I did as the preparations in the nature of examining prior patents and publications, and the preparations of exhibits was not completed. The building of the Model Machines has consumed a great deal of time and helped to prevent my being examined as a witness at an earlier day.



Sworn to and subscribed before me

this 29th day of Dec. 1898, at

New York, N. Y.



L. E. Davidson
Notary Public (N.Y.)

UNITED STATES CIRCUIT COURT

DISTRICT OF NEW JERSEY.

-----)
AMERICAN GRAPHOPHONE COMPANY :
)
-against- :
)
UNITED STATES PHONOGRAPH COMPANY. :
-----)

4005

TESTIMONY taken on behalf of the defendant, United States Phonograph Company, before S.D. Oliphant, Esq., pursuant to agreement, at the office of W. B. Vansize, Esq., No. 253 Broadway, New York City, on Thursday, January 5th, 1899.

Present: H. W. Hayes, Esq., for defendant;
Philip Mauro, Esq., for complainant.

ALFRED CLARK, a witness ~~xxxx~~ recalled by the defendant, deposes and says:

Q.1. You have already testified in this case, have you not?

A. Yes.

Q.2. I show you letters to the United States Company, purporting to come from the Columbia Phonograph Company to the United States Phonograph Company, and ^{copies of} letters from the United States Phonograph Company to the Columbia Phonograph Company, being part of the same correspondence. Did you take these letters and these ~~xxxx~~ copy books con-

taining copies of letters from the files of the United States Phonograph Company?

A. Yes.

Q.3. From your knowledge of the affairs of the United States Phonograph Company, can you state whether correspondence as shown by these letters and copies took place between the United States phonograph Company, or its officers, and the Columbia Phonograph Company, or its officers, and whether these letters and copies of letters comprise such correspondence?

A. Yes, they do.

Defendant's counsel offers in evidence the following letters:

Letter from Geo. E. Tewksbury to E.D.Easton, dated, Newark, N.J., Sept. 24, 1894, and the same is marked, "Defendant's Exhibit Tewksbury ~~Rxxxx~~ Letter, Sept. 24, 94, S.D.O., Ex., Jan. 5, 1899"

✓ Letter from R.F.Cromelin to United States Phonograph Company, dated Washington, N.J., October 20, 1894, and the same is marked "Defendant's Exhibit Cromelin Letter Oct. 20, 94, S.D.O., Ex., Jan. 5, 1899".

Letter from V.H.Emerson to Columbia Phonograph Company, dated Newark, N.J., October 22, 1894, and the same is marked "Defendant's Exhibit ~~Rxxxx~~ Emerson Letter Oct. 22, 94, S.D.O., Ex., Jan. 5, 1899".

✓ Letter from F. Dorian to United States
Phonograph Company, dated Washington, D.C.,
October 10, 1895, and the same is marked
"Defendant's Exhibit Dorian Letter, Oct.
10, 95, S.D.O., Ex., Jan. 5, 1899".

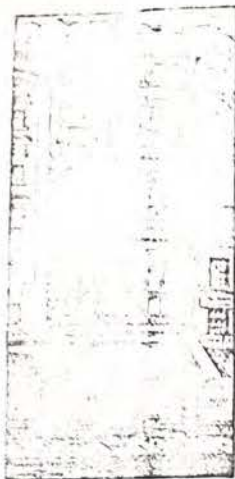
Letter from V. H. Emerson to Columbia
Phonograph Company, dated Newark, N.J.,
Oct. 12, 1895, and the same is marked
"Defendant's Exhibit Emerson Letter
Oct. 12, 95, S.D.O., Ex., Jan. 5, 1899.

✓ Letter from F. Dorian to United States
Phonograph Company, dated Washington, D.C.,
Oct. 14, 1895, and the same is marked
"Defendant's Exhibit Dorian Letter, Oct.
14, 95, S.D.O., Ex., Jan. 5, 1899.

Letter from V. H. Emerson, to Columbia
Phonograph Co., dated Newark, N.J., Oct. 16,
1895, and the same is marked, "Defendant's
Exhibit, Emerson Letter, Oct. 16, 95, S.D.O.,
Ex., Jan. 5, 1899.

Telegram from V. H. Emerson to E. D. Easton,
Easton, dated, Newark, N.J., Aug. 2, 1894,
and the same is marked "Defendant's Exhibit
Emerson Telegram, Aug. 2, 94, S.D.O., Ex.,
Jan. 5, 1899."

Letter from V. H. Emerson to E. D. Easton,
dated Newark, N.J., Aug. 2, 1894, and the same is
marked "Defendant's Exhibit Emerson Letter,
Aug. 2, 94, S.D.O., Ex., Jan. 5, 1899".



BALTIMORE OFFICE
110 E. BALTIMORE STREET

LONG DISTANCE TELEPHONE 1172
CABLE ADDRESS "COLPHO."

Columbia Phonograph Co.
Under Authority of the North American Phonograph
Co. and the American Graphophone Co.

319 PENNSYLVANIA AVENUE
Washington, D.C.

SOLE AGENTS
IN MD., AND DIST. OF COL.
FOR THE

Dynamore
Typewriter.

EDISON
PHONOGRAPHS,
PERFECTED
GRAPHOPHONES,
Phonograph and
Graphophone Supplies.

Typewriter Papers,
Ribbons
and
Supplies.

EDWARD D. EASTON, President,
Wm. H. SMITH, V. Pres. and Treas.
R. F. CHOMELIN, Secretary.
P. DORIAN, Manager.

Oct. 20, 1894.

The United States Phonograph Company,

37 Orange St.,

Newark, N. J.

OCT 21 1894

ANSWERED

Gentlemen:

Your favor of the 19th inst., acknowledging receipt of our recent order for 173 records, has been duly received.

We thank you for your pleasant attitude in this respect.

The list of records necessary to complete the order for one thousand is now being prepared, and will be forwarded to you when completed. We note also the increase in price of your records to \$650. per thousand.

Please observe particularly that "Master" records are what we desire, free from scratches or imperfections of any kind.

If it more agreeable to you, ^{and} as you will so indicate, we may be able to send you the list from day to day, rather than await its entire completion.

Yours very truly,

Secretary.



P.S. Because of Mr. Easton's absence in New York until Wednesday, I think it perhaps best that we hold the entire list here until his return, instead of forwarding in sections, as suggested above.

R. D. E.

Encl. Legal Box 101

PHONOPHONES,

GRAPHS,
SAL
RECORDS,
CLOCKWORK
MOTORS

...and...

SUPPLIES FOR
GRAPHOPHONES and
PHONOGRAPHS.

BALTIMORE OFFICE,
110 E. BALTIMORE STREET.

LONG DISTANCE TELEPHONE, 1172.
CABLE ADDRESS, "COLPHO."

COLUMBIA PHONOGRAPH COMPANY.

Under Authority of the American Graphophone Co.
And Licensee of the Phonograph Patents of Thomas A. Edison.

219 Pennsylvania Avenue.

EDWARD D. EASTON, PRESIDENT,
W. H. SMITH, V.-PRES. & TREAS.
R. F. CROMELIN, SECRETARY.
FRANK DORIAN, MANAGER.

Washington, D. C., Oct. 7, 1895

United States Phono. Co.,

Newark, N. J.

OCT 8, 1895

Gentlemen:-

ANSWERED.

We received from you this morning 31 records, which after carefully testing we regret to say we are obliged to return, as they are not suitable for our use.

We do not believe we have been getting your best records of late. Certainly we hope not. We can use only the very finest records. We would undoubtedly buy a great many more of you if we could get them of the right quality. We are willing to pay \$1 a piece net for first class original records. They must be smooth and otherwise perfect, both musically and mechanically. Do you care to deal with us on this basis?

Yours very truly,

F. Dorian Manager.

F. D.



In Edison Legal Box

GRAPHOPHONES,
ON
NOGRAPHS,
MUSICAL
RECORDS,
CLOCKWORK
MOTORS

...and...

SUPPLIES FOR
GRAPHOPHONES and
PHONOGRAPHS.

BALTIMORE OFFICE,
110 E. BALTIMORE STREET.

LONG DISTANCE TELEPHONE, 1172.
CABLE ADDRESS, "COLPHO."

COLUMBIA PHONOGRAPH COMPANY.

Under Authority of the American Graphophone Co.
And License of the Phonograph Patents of Thomas A. Edison.

EDWARD D. EASTON, PRESIDENT.
W. H. SMITH, V-PRES. & TREAS.
R. F. CROMELIN, SECRETARY.
FRANK DORIAN, MANAGER.

919 Pennsylvania Avenue.

Washington, D. C., Oct. 16, 1895

United States Phonograph Company,

OCT 12 1895

Newark, N. J.

ANSWERED

Gentlemen:-

We have your favor of 8th inst. and are quite satisfied with the proposition you make to furnish perfect master records at from \$1 to \$3 each, according to the subject. We enclose herewith a list of such records which you may send us, subject to return if not satisfactory. We hope these will prove so well suited to our purpose that we can place other orders with you.

Very truly yours,

F. Dorian

F. D.

Manager.



In Edison Legal Box

ADN FOR MASTER RECORDS FROM UNITED STATES PHONOGRAPH CO.

Songs by Myers, one each of The Bridge, O Promise Me, The Girl I
Love, Little Willie, Dear Old Pals, A Soldier and a Man, Sing Me
Those Pretty Songs Again, The Clock of the Universe, After
Twenty Years, The Palms, Bedouin Love Song, The Sidewalks of New
York.

Songs by Gaskin, one each of Sweet Fleur de Lis,
O Promise Me, Say Au Revoir, Kate Mahone, The Fatal Wedding.

Songs by Quinn, one each of I Dont Want To Play In Your
Yard, While The Dance Goes ON, The Broadway Girl, The Merry
Miller, Sally, Doolan's Coterie, Hold Your Head Up Patsy McGann,
Only Me, A Little Bunch of Whiskers on His Chin, Poor Little Mary,
Mr. Captain Stop The Ship, I Love My Love in the Springtime, She
Sailed With a Boarder to Chicago, Still His Whiskers Grew, Little
Willie Brown, The Parrot Said.

Issler's Orchestra, one each Chimes of Normandie
Schottische, Battle of Manassas, Suawancee River, Loin Du Bal Waltz
Trip to Chinatown Lancers, The Husking Bee, The Trolley Galop,
The Virginia Skedaddle.

Spencer's songs, one each Mrs. Awkins, A Cruel Hiss,
Climbing to the Sky, Miss Jones Came Back and Carry Me Back to
Old Virginia. *of Swinging on the Golden Gate*.

Minstrel records, one each of the Old Log Cabin, These
Bones Shall Rise Again, Up On The Golden Shore.

Miscellaneous selections, one each of the Irish and
Germans by J. W. Kelley, The Railroad Sketch by Wilder, The
Columbian Exposition March by Gilmore's Band; two of the Ravings
of McCollough.

Oct. 10/95.

Total 55

In Edison Legal Box

BALTIMORE OFFICE,
110 E. BALTIMORE STREET.

LONG DISTANCE TELEPHONE 11
CABLE ADDRESS, "COLPHO"

RECORDS,
CLOCKWORK
MOTORS

...and...
SUPPLIES FOR
GRAPHOPHONES and
PHONOGRAPHS.

COLUMBIA PHONOGRAPH COMPANY.

Under Authority of the American Graphophone Co.
And Licensee of the Phonograph Patents of Thomas A. Edison.

919 Pennsylvania Avenue.

Washington, D. C.,

EDWARD D. EASTON, PRESIDENT.
W. H. SMITH, V.-PRES. & TREAS.
R. F. CROMELIN, SECRETARY.
FRANK DORIAN, MANAGER.

Oct. 14, 1895

United States Phonograph Company,

87 Orange Street,

Newark, N. J.

OCT 16 1895

ANSWERED

Gentlemen:-

We are sorry to learn you cannot fill our order for records as given. We assumed that you could furnish masters of anything on your catalogue. Kindly send forward the Issler and Spencer records and any of the others which you can furnish. Would it be too much trouble to mark on your catalogue and send to us a list of such records as you can furnish at this time, and then we will immediately send you an order for whatever we can use.

Very truly yours,

F. Dorian Manager.

F. D.



In Edison Legal Box

Q.4. From your acquaintance with the affairs of the North American Phonograph Company, can you state whether a licensee company of the North American Phonograph Company, similar to the other licensee companies, known as sub-companies, was organized for the State of Alabama, at about the time the other sub-companies were organized, called the "Alabama Phonograph Company"?

Objected to as incompetent,
irrelevant, immaterial, and calling for
secondary evidence.

A. Such a company was formed with head offices at Anniston, Alabama.

Q.5. Do you know if it did any business, and if so, about when?

A. As I remember it, the business was very small, but I cannot give exact dates. I know that it was doing business in 1890.

Q.6. Do you know whether a similar sub-company was organized and did business in the state of New Jersey, known as the "New Jersey phonograph Company"?

Same objection.

A. Yes, such a company was organized.

Q.7. During what period did that company do business, if you know?

Same objection.

A. At about the same time that the Alabama Company was doing business.

Q.8. Can you tell about when the New Jersey Company stopped doing business?

Same objection.

A. No, not exactly.

Q.9. Do you know who was the manager of the New Jersey Phonograph company while it continued business?

Same objection.

A. A Mr. Smith at first, and after that a Mr. V. H. Emerson.

N.F.

Q.10. Did you know Mr. Russell, who was connected with the American Graphophone Company?

Same objection.

A. Yes.

Q.11. What position did he hold in the American Graphophone Company?

Objected to as irrelevant and immaterial.

A. Manager.

Q.12. Do you know what position Jesse Lippincott had in the North American Phonograph Co.?

Same objection.

A. He was president of the North American Phonograph Company.

Defendant's counsel offers in evidence the following letters: subject to ~~xxx~~ objection as to their materiality.

✓ Letter from E. D. Easton to V. H. Emerson, dated March 28th, 1894, and the same is marked "Defendant's Exhibit Easton Letter, March 23, 94, S.D.O., Ex., Jan. 5, 1899".

✓ Letter from E.D. Easton, to G. E. Tewksbury, dated September 12, 1894, and the same is marked ~~XXXXXX~~ "Defendant's Exhibit, Easton Letter, Sept. 12th, 1894, S.D.O., Ex., Jan. 5, 1899".

✓ Letter from V. H. Emerson to Columbia Phonograph Company, dated May 11th, 1894 and the same is marked "Defendant's Exhibit, Emerson Letter, May 11, 94, S.D.O. Ex., Jan. 5, 1899".

✓ Letter from E.D. Easton to United States Phonograph Company, dated May 12, 1894, and the same is marked "Defendant's Exhibit Easton Letter, May 12, 94, S.D.O., Ex., Jan. 5, 1899".

Letter from E. D. Easton, to United States Phonograph Co. dated Sept. 12, 1894, and the same is marked "Defendant's Exhibit, Easton Letter, Sept. 12, ~~xx~~ 94. S.D.O., Ex., Jan. 5, 1899".

✓ Letter from E. D. Easton to United States Phonograph Co., dated Sept. 17, 1894, and the same is marked "Defendant's Exhibit, Easton Letter, Sept. 17, 94, S.D.O., Ex., Jan. 5, 1899".

✓ Letter from E. D. Easton to V. H. Emerson, dated, Aug. 1, 1894, and the same is marked "Defendant's Exhibit, Easton Letter, Aug. 1, 94, S.D.O., Ex., ~~Aug 1, 94~~ Jan. 5, 1899",

Letter from N. E. Russell to Jesse Lippincott, dated Dec. 28, 1889, and the same is marked "Defendant's Exhibit, Russell Letter, Dec. 28, 89, S.D.O., Ex., Jan. 5, 1899".

Letter from N.E. Russell to Jesse Lippincott, dated Feby. 1, 1890, and the same is marked "Defendant's Exhibit, Russell Letter, Feb. 1, 90, S.D.O., Ex., Jan. 5, 1899".

Letter from N. E. Russell, to Jesse Lippincott, dated Feby. 17, 1890, and the same is marked "Defendant's Exhibit, Russell Letter, Feby. 17, 90, S.D.O. Ex., Jan. 5, 1899".

Letter from N. E. Russell to Jesse Lippincott, dated Mch. 15, 1890, and the same is marked "Defendant's Exhibit, Russell Letter, Mch. 15, 90, S.D.O. Ex., Jan. 5, 1899".

Letter from N. E. Russell to Jesse Lippincott, dated Mch. 31, 1890, and the same is marked "Defendant's Exhibit, Russell Letter, Mch. 31, 90, S.D.O., Ex., Jan. 5, 1899".

Letter from N. E. Russell, to Jesse Lippincott, dated Apr. 22, 1890, and the same is marked "Defendant's Exhibit, Russell Letter, Apr. 22, 90, S.D.O., Ex., Jan. 5, 1899".

Letter from N. E. Russell to Jesse Lippincott, dated Apl. 30, 1890 and the same is marked "Defendant's Exhibit, Russell Letter, Apl. 30, 90, S.D.O. Ex., Jan. 5, 1899".

Letter from N. E. Russell to Jesse Lippincott, dated May 1, 1890, and the same is marked "Defendant's Exhibit, Russell Letter, May 1, 90, S.D.O., Ex., Jan. 5, 1899".

Letter from N. E. Russell to Jesse Lippincott, dated May 21, 1890 and the same is marked "Defendant's Exhibit, Russell Letter, May 21, 90, S.D.O., Ex., Jan. 5, 1899".

Letter from Alabama Phono. Co., to N.J. Phono. Co., dated Jan. 4, 1892, and the same is marked "Defendant's Exhibit, Alabama Phono. Co. Letter, Jan. 4, 92, S.D.O., Ex., Jan. 5, 1899".

Easton-Emerson Letter of March 28, 1894.

CHAS. J. BELL,
President and Treasurer.

EDWARD D. EASTON,
Vice-President, General Manager and Secretary.

Factory:

Bridgeport, Conn.

AMERICAN GRAPHOPHONE COMPANY.

Directors:
Chas. J. Bell. Edward D. Easton.
Gardiner G. Hubbard. Wm. E. Bond.
Chas. S. Tainter. John H. White.
Sam'l M. Bryan. R. O. Holzman.
Jas. A. Bates.

Principal Office, 919 Penna. Ave.

WASHINGTON, D. C., March 28, 1894.

DEAR MR. EMERSON—Mr. Tewksbury writes under date of March 27th that you are continuing your investigation on the subject of blanks, and will write us as soon as you have any new light.

We have examined carefully our stock running back nearly six months, and on records where the coating has appeared, usually to a very slight extent (but in a small proportion of the cases heavily), we find it brushes off clean and there is not the slightest evidence of injury to the record, *even if we reproduce without brushing off the coating*. Of course we agree with you that this coating is undesirable; but it appears on Edison blanks as well as on ours.

Any suggestions will be appreciated.

Yours truly,
E. D. EASTON.

{ Dictated to and transcribed
from the new
Graphophone. }

Easton-Tewksbury Letter of September 12, 1894.

BALTIMORE OFFICE,
110 East Baltimore Street.

Long Distance Telephone 1172.
Cable Address "Colpho."

COLUMBIA PHONOGRAPH CO.,

Under authority of the North American Phonograph Co.
and the American Graphophone Co.

919 PENNSYLVANIA AVENUE,

WASHINGTON, D. C.

Sole Agents in Md. and Dist. of Col. for the Densmore
Typewriter.

EDISON PHONOGRAPHS.

PERFECTED
GRAPHOPHONES,

PHONOGRAPH AND GRAPHOPHONE
SUPPLIES.

Typewriter Papers, Ribbons
and Supplies.

EDWARD D. EASTON, President.
WM. H. SMITH, V. Pres. and Treas.
R. F. CROMELIN, Secretary.
F. DORIAN, Manager.

Sept. 12-94.

Sept. 13, 1894,

Answered.

DEAR MR. TEWKSBURY:

We are sending you to-day a check in full for cash due. We also owe you for blanks.

Please send the Columbia Phonograph Co. a memorandum of credit for 182 records at 60 cents, \$109 20. This will nearly cancel the charge for blanks at 11 cents.

Then send the American Graphophone Co. a similar bill, which will be paid by check of Graphophone Co.

This will result in clearing up the Columbia Company's account with you very close, will leave no blanks due you, and will leave the Graphophone Co. indebted to you in the sum of \$109.20, a balance of a few dollars only then being due from Columbia.

Yours very truly,

E. D. EASTON,
President.

{ Dictated to and transcribed
from the new
Graphophone. }

Emerson-Columbia Phonograph, Letter of May 11, 1894.

COPY OF LETTER FROM V. H. EMERSON TO COLUMBIA PHONO-
GRAPH Co., MAY 11TH, 1894.

We are reluctantly compelled to cancel our arrangement with you in so far as it relates to the acceptance of Graphophone blanks in part payment. We will leave the price as we agreed, and we do not think that you can consistently ask us to accept a product which we know to be inferior and detrimental to our trade. We have now worked up all the blanks received from the Graphophone people, except the 11 returned for your inspection.

We appreciate your anxiety to put us right in this matter by your instructions that we should return all records made on Graphophone blanks not found satisfactory. We to day ship you 140 orchestras. We find the Graphophone blanks get worse with age instead of bettering, and this of itself should indicate to you that there is something wrong in the composition or its preparation.

Easton-United States Phonograph Letter of May 12, 1894.

CHAS. J. BELL,
President and Treasurer.

EDWARD D. EASTON,
Vice-President, General Manager and Secretary.

Factory :

Bridgeport, Conn.

AMERICAN GRAPHOPHONE COMPANY.

Directors :

Chas. J. Bell.	Edward D. Easton.
Gardner G. Hubbard.	Wm. E. Bond.
Chas S. Tainter.	John H. White.
Sam'l M. Bryan.	R. O. Holtzman.
	Jas. A. Bates.

Principal Office, 919 Penna. Ave.

WASHINGTON, D. C., April 5, 1894.

UNITED STATES PHONOGRAPH Co.,
Newark, N. J.

GENTLEMEN—At the request of the Columbia Phonograph Co., we write to advise you that the 1,000 blanks shipped you from our factory have been charged to and paid for by the Columbia Company, and do not now, nor did they ever stand on our books against you.

Yours truly,

E. D. EASTON;

General Manager.

{ Dictated to and transcribed }
from the new
Graphophone. }

Easton—U. S. Phonograph Company Letter, September 17th, 1894.

CHAS. J. BELL,
President & Treasurer.

FACTORY:
BRIDGEPORT, CONN.

THE AMERICAN
GRAPHOPHONE CO.

PRINCIPAL OFFICE:
919 PENNSYLVANIA AVE.

EDWARD D. EASTON,
Vice Pres., Genl. Manager & Secy.

DIRECTORS.
Chas. J. Bell,
Gardiner G. Hubbard,
Chas. S. Tainter,
Saml. M. Bryan,
Edward D. Easton,
Wm. E. Bond,
John H. White,
R. O. Holtzman,
Jas. A. Bates.

WASHINGTON, D. C., Sept. 17-94.

UNITED STATES PHONOGRAPH CO.,
91 Orange Street,
Newark, N. J.

GENTLEMEN—Referring to yours of Sept. 15th, you may hold the
blue records until you have enough to fill a barrel, if you please.

Yours truly,

E. D. EASTON,
General Manager.

{ Dictated to and transcribed
from the new
Graphophone. }

Easton—Emerson Letter of August 1st, 1894.

CHAS. J. BELL,
President & Treasurer.

FACTORY:
BRIDGEPORT, CONN.

THE AMERICAN
GRAPHOPHONE CO.

PRINCIPAL OFFICE:
919 PENNSYLVANIA AVE.

EDWARD D. EASTON,
Vice Pres., Genl. Manager & Secy.

DIRECTORS.
Chas. J. Bell,
Gardiner G. Hubbard,
Chas. S. Tainter,
Saml. M. Bryan,
Edward D. Easton,
Wm. E. Bond,
John H. White,
R. O. Holtzman,
Jas. A. Bates.

WASHINGTON, D. C., Aug. 2-94.

Aug. 3, 1894,

Answered.

DEAR MR. EMERSON:

Thanks for your telegram of to-day. Mr. Cromelin understood
you would furnish the information immediately upon application. I,
of course, knew nothing of your disposition except through him, and
ask your pardon for the inquiry.

Yours very truly,

E. D. EASTON.

{ Dictated to and transcribed
from the new
Graphophone. }

Easton—Emerson Letter of August 2d, 1894.

CHAS. J. BELL,
President & Treasurer.

EDWARD D. EASTON,
Vice Pres., Genl. Manager & Secy.

FACTORY:
BRIDGEPORT, CONN.

THE AMERICAN

GRAPHOPHONE CO.

PRINCIPAL OFFICE:
919 PENNSYLVANIA AVE.

DIRECTORS.
Chas. J. Bell,
Gardiner G. Hubbard,
Chas. S. Tainter,
Saml. M. Bryan,
Edward D. Easton,
Wm. E. Bond,
John H. White,
R. O. Holzman,
Jas. A. Bates.

WASHINGTON, D. C., Aug. 1st, 1894.

Aug. 2, 1894,

Answered.

DEAR MR. EMERSON:

Mr. Cromelin has written me of your talk on the subject of blanks. I should like to meet, soon, the man you mentioned. When and where can I see him? Kindly wire answer as early to-morrow as possible, as I am likely to start north and want to dove-tail several matters.

Hope everything is coming out all right on the Atlantic City deal.

Sincerely yours,

E. D. EASTON.

Mr. V. H. Emerson,
Newark, N. J.

{ Dictated to and transcribed }
{ from the new }
{ Graphophone. }

Volta Graphophone Co. }
vs. }
Edison Phonograph Works. }

**Defendant's Exhibit Russell Letter No. 1., E. C., Spl.
Exr., December 29, 1894.**

Home Office: James H. Saville, General Manager.
Charles S. Tainter, Associate Manager.
Glover Building, Washington, D. C.

MANUFACTORY OF THE
[Cut] AMERICAN GRAPHOPHONE COMPANY.
BRIDGEPORT, CONN., March 31st, 1890.

Agency:
160 Broadway, New York City.

JESSE H. LIPPINCOTT, Esq.,
160 Broadway, New York City:

DEAR SIR—I have received your letter of the 29th instant with extract concerning cylinders from letter of the Central Neb. Phono. Co., and have carefully noted same.

It will be unnecessary to return the 88 boxes of condemned cylinders to the factory, as the difficulty is undoubtedly due to freezing and moisture, and we shall be able to make just as good progress without them in investigating this difficulty.

So far we have been unable to make a cylinder of this kind which cannot be spoiled by freezing, but we have not by any means exhausted our efforts in this direction.

The removal of our cylinder department to more appropriate quarters has lately interfered with experimental work.

Concerning regulators for the price of which you have applied to the home office, we hold your order as instructed for further advice.

The Florida Phono. Co. notify us of the return of a recorder wrench which reached them broken. I will replace it on its receipt. I received on Saturday, the 29th instant, from J. W. Saunders the following letter:

NORWALK, CONN., March 28th, 1890.

AMERICAN GRAPHOPHONE Co.,
Bridgeport, Conn:

GENTLEMEN—Will you please state by return particulars as to your graphophone, and price per year for rental, whether this is paid monthly or how, and oblige,

Yours very truly,
J. W. SAUNDERS,
Stenographer & Typewriter.

Will you kindly do the needful in the above case, and oblige,

Yours very truly,
N. E. RUSSELL,
Manager.

Volta Graphophone Co. *et al.* }
vs.
Edison Phonograph Works. }

**Defendant's Exhibit Russell Letter No. 2, E. C., Sp.
Er., December 29, 1894.**

FACTORY OF AMERICAN GRAPHOPHONE CO.,

BRIDGEPORT, CONN., April 22d, 1890.

JESSE H. LIPPINCOTT, Esq.,
No. 160 Broadway, New York City, N. Y.:

DEAR SIR—Your letters of the 21st inst. with orders No. 663,
664, 665 and 666 are at hand, and have my best attention.

I note return of machines, which will be acknowledged on their
arrival.

The belts for Hand Graphophones to which you refer were for-
warded as a precautionary measure, and were sent without charge.
All the machines sent out had belts, but they were not satisfactory,
and so the duplication.

In reference to imperfect cylinders, would say that, being on the
eve of improving the quality by coating inside with paraffine, it
would seem to all our interests to replace those which are found
radically defective, and which cause complaints. We shall also im-
prove our method of shipping cylinders shortly; and meanwhile
preserve our relations as pleasantly as possible with users. There
should be no cause for complaint in this particular, and feel confi-
dent it can be eliminated.

Yours very truly,
N. E. RUSSELL,
Manager.

Volta Graphophone Co. et al. }
vs. }
Edison Phonograph Works. }

**Defendant's Exhibit Russell Letter No. 3, E. C., Spl.
Exr., December 29, 1894.**

FACTORY OF AMERICAN GRAPHOPHONE CO.

BRIDGEPORT, CONN., April 30th, 1890.

JESSE H. LIPPINCOTT, Esq.,
No. 160 Broadway,
New York City :

DEAR SIR—I have received your letters of the 28th inst., with notification of return of machines by Iowa Company and covering order No. 686, which has my best attention.

In regard to cylinders complained of by Ohio Phono. Co., I would say, that although I believe these left the factory in excellent condition and have since been so placed as to spoil them, that I will replace all which, on individual examination, are now found to be defective. Let them examine all carefully and report to you, and then kindly make an order in usual way, stating upon its face that they are to replace above, and I will fill it, "no charge." Let the defective cylinders remain with the Ohio Co., as we note the difficulty (moisture), and do not care to pay freight on them.

Very shortly, now, we shall be sending you cylinders which will stay as made and do away with these troubles. Meanwhile, I think it best to avoid aggravating them by pursuing above course.

Yours very truly,

N. E. RUSSELL,

Mr.

Q.13. I show you a machine. Will you please state what it is?

A. That is a body or top of what is known as Type C Graphophone.

Q.14. How does that differ from Type B Graphophone, in a general way?

A. In the Type B graphophone the recorder and the reproducer are detachable and were so designed as to be taken off the machine when not in use. In the Type C machine, they are part of the instrument and cannot be taken off easily.

Q. Defendant's counsel offers the machine in evidence and it is marked "Defendant's Exhibit Type C Graphophone", S.D.O., Ex. Jan. 5, 1899".

Q.15. I show you another piece of mechanism; will you please state what that is?

A. It is a ~~xxxxxx~~ recorder of a Type B Graphophone.

Defendant's counsel offers the apparatus in evidence, and the same is marked, "Defendant's Exhibit Type B Graphophone Recorder, S.D.O., Ex., Jan. 5, 1899".

Q.16. In your testimony given before in this case, you spoke of certain graphophones which were sent to sub-companies by the North American Phonograph Company, or Jesse H. Lippincott, and afterwards returned by ~~them~~ the sub-companies, a part of which ~~xx~~ machines you afterwards assisted

to inspect at the factory of the American Graphophone Company at Bridgeport. Please state what type of graphophone these machines were?

A. Types B and C.

CROSS EXAMINATION BY MR. MAURO:

XQ 17. Had you any personal knowledge of any graphophones put out by the North American Phonograph Company and which were used for practical purposes?

A. Yes.

XQ 18. For what purposes were they used?

A. Recording and reproducing.

XQ 19. Were they operative machines?

A. Yes.

RE-DIRECT EXAMINATION:

R-x-Q.20. How successful was this operation?

Objected to as immaterial.

A. They met with poor success.

R-x-Q.21. I show you a machine referred to in the testimony of Mr. Vansize as being the type of graphophone now put on the market by the complainant. Do you know where this graphophone came from; if so, please state?

A. It came from the factory of the American Graphophone Company.

R-x-Q.22. What is this graphophone called?

A. I believe that is called the Columbian Graphophone.

R-x-Q.23. Did you purchase it on behalf of the de-

fendant?

A. I did.

R-x-Q.24. When?

Less than a month ago.

R-x-Q.25. Do you know whether that is one of the modern types of graphophones now manufactured and sold by the complainant?

A. It is.

R-x-Q.26. Please look at this machine and see what its number and type is, as appears from the marks on it?

A. It is numbered ~~222~~, 206,468, Type AT.

Alfred Black

XXXXXXXX

UNITED STATES CIRCUIT COURT

DISTRICT OF NEW JERSEY.

-----)	4005
AMERICAN GRAPHOPHONE COMPANY	:	
)	On Patent No
-against-	:	341,287.
)	
UNITED STATES PHONOGRAPH COMPANY.	:	
-----)	

TESTIMONY taken on behalf of the defendant, United States Phonograph Company, before S.D.Oliphant, Esq., pursuant to agreement, at the office of W.B.Vansize, Esq., No. 253 Broadway, New York City, on Thursday, January 5th, 1899.

Present: H.W.Hayes, Esq., for defendant,
Philip Mauro, Esq., for complainant.

FRANK L. CAPPS, a witness xxxxx produced on behalf of defendant, being duly sworn, testifies as follows:

Q.1. Please state your age, and residence?

A. I am 29 years old and live at 137 Elizabeth Avenue, Newark, N.J.

Q.2. State what your various employments have been down to the present time?

A. I have been employed in laboratory work as a machinist in the telephone business and the phonograph business.

Q.3. By whom and during what time were you employed on telephone work?

A. I was employed on telephone work from the years 1888 until 1894, and then I went to work for the United States Phonograph Company, carrying on experimental work in connection with the phonograph. I was in their service until December 1897..

Q.4. After you left the employ of the United States Phonograph Company, in what employment have you been engaged?

A. I have been conducting a manufacturing business various kinds of making ~~xxxxxxx~~ apparatus connected with talking machines .

Q.5. Have you now a machine shop of your own?

A. Yes.

Q.6. Have you given any especial attention to methods of copying phonograph records mechanically, and if so, during what time were you on such experiments?

A. I experimented with copying phonographic records all the time that I was with the United States Phonograph Company, and have carried on experiments since then whenever I have had time to do so.

Q.7. I show you a sketch, "Complainant's Exhibit Diagram Defendant's Duplicating Apparatus". Are you familiar with the duplicating apparatus used by the United States Phonograph Company, and if so, does this sketch show practically the mechanism of that apparatus? In answering this question, you may assume that Figure 11 on the sketch refers to a reproducing ball and Figure 10 to a cutting stylus?

A. Yes, I am familiar with the apparatus.

While there are some differences in details, this shows the general construction of the apparatus.

Q.8. By whom were those machines built?

A. I built them.

Q.9. Are you familiar with the working of the machine?

A. Yes.

Q.10. Please state in a general way the operation of the machine?

A. The operation of the machine is that the upper cylinder 4 is the master record, the lower one 3 is a blank cylinder. The bar carrying reproducer ball No. 11 is pressed downward by the undulations of the master record. This motion is transmitted to a bar carrying the stylus No. 10, and presses it into the wax varying depths according to the undulations of the master record.

Q.11. To make this machine operative, at what speed is the master record made to revolve as compared with the speed at which it revolved when the original record was made?

A. It was made to revolve at about one-third of the speed of the original record.

Q.12. What is the purpose of revolving it at a less speed?

A. This is done to prevent the bar from vibrating as it would if set in rapid motion, and simply use it as a lever to work back and forth in accordance with the undulations.

Q.13. I show^{you} one of the patents in suit, No. 341,237, and ask you to look at the mechanism shown in Figures 1, 2 1a and 3 and the description of those figures in the specification of the patent, and ask you whether you understand that mechanism as shown in the diagrams and specification?

A. Yes, I understand it.

Q.14. Have you made a study of those diagrams and specification with regard to them?

A. Yes.

Q.15. Please state whether or not in your opinion, mechanism such as shown there would be successful in making a metallic copy of the wax record as described in the patent?

A. It would not.

Q.16. What are your reasons for arriving at that conclusion?

A. The bars which transfer the record have to slide back and forth in their bearings. The wax record has to be electrotyped and a copper record produced from it. This has never been successfully done, and if a copper record were produced that way it would be impracticable to mount it on the machine so that it would run true.

Q.17. You speak of the bar sliding in its bearing. What effect would that have on the successful operation of the machine ?

A. The movement of the discs is at right angles to the travel of the bars and when you attempt to make a record with it the ~~mx~~ thrust caused by the pressure of these bars against the discs would make them bear so hard against

their supports that they could not slide freely.

Q.18. If this machine were used to copy from a wax ~~maxxax~~ original to a wax blank, would or would not the defect which you have just pointed out in regard to the bars prevent successful duplication?

A. It would prevent it.

CROSS EXAMINATION BY MR. MAURO:

XQ 19. Referring to the structure "Defendant's Duplicating Apparatus", I understand that the machines which you built for the defendant employed a transferring device for communicating the thrust imparted by the master record to the cutting style similar to that marked 10, so that the latter cut in the wax ~~direct~~ ^{duplicate} a copy of the original record, and that the transferring or thrust mechanism represented in the sketch corresponds in principle and in operation with that actually employed by defendants, though not in actual detail. Is that the case?

A. Yes.

XQ 20. You are familiar, are you not, with various forms of transferring or thrust mechanism differing from each other in detail, but operating in substantially the same way?

A. Yes.

XQ 21. And you could as a mechanic vary the forms of such mechanism to an almost unlimited extent, could you not?

A. I could vary them some, but not to an unlimited extent.

XQ 22. How do you know that the transfer of a

record into metal by the means described in this patent has never been successfully done?

A. I know because I am familiar with the working of delicate metal and with the nature of phonograph undulations, and I have tried various experiments to produce permanent masters for the copying phonographic records, but have never been able to do it.

XQ 23. You mean, do you not, that the results obtained in this way were not commercially successful?

A. No, I have never known of a record being produced that could hardly be called a record, that was even a fair record.

XQ 24. You have in mind now, I presume, the difficulty of the electrotyping operation?

A. Yes, partly.

XQ 25. Assuming the existence of the master record in metal, there would be no serious difficulty, would there, in making a copy thereof by means of a thrusting device or transfer mechanism, in another metal tablet?

A. No, I don't think it could be done .

XQ 26. What would be the difficulty?

A. The difficulty would be that the pressure put on the bars which transmit the vibrations by the hard nature of iron, would make the bar work so hard that the copper would be burnished down and almost if not completely obliterated in attempting to make the transfer.

XQ 27. Did you ever try that operation?

A. Yes.

XQ 28. Using copper at one side and soft iron at the other?

A. Yes.

XQ 29. State just what result you obtained?

A. I was unable to get the copper disc to run true and could only get the stylus to cut here and there, and on examining the copper afterwards it showed bright streaks where the record had been dulled by the work of driving the bars.

XQ 30. Is, or is not, the use of a lever or train of levers for transmitting motion a common and well known equivalent in mechanics for a reciprocating bar?

A. Well, levers are used for the same purpose, but of course they don't work in a straight line, and I don't see that they can be called the equivalent for a bar moving in a straight line.

XQ 31. If the object were to produce at one end of a lever or a bar a copy of movement imparted to the other end of the lever or bar, would or would not that result be obtained equally in the two cases?

A. Yes.

XQ 32. Suppose a machine constructed as illustrated in Figure 1 of the patent in suit were handed you, and you found in using it to transfer a record from one wax tablet to another, that the bar did not slide freely in its bearings, as you have conjectured would be the case, do you think you would have any difficulty by the exercise of your mechanical skill and knowledge in obviating that difficulty?

A. I could overcome the difficulty of the friction of the bar by substituting levers, as you say.

XQ 33. Couldn't you do it another way?

A. A lever working on a small pivot is the only method which I know of that I would think of using.

XQ 34. Would you discard all other mechanical means because you think a lever is so much more appropriate?

A. Yes.

XQ 35. Do you find in this patent a master record, a blank tablet, means for rotating the same, a transfer mechanism operating between the master and blank, and means for causing the transfer mechanism to progress with the spirals of the master record?

A. Yes.

RE-DIRECT EXAMINATION:

R-d-Q.36. You speak of the mechanism shown in the exhibit before you, as copying the master record. In the copy made by that mechanism will indentations in the master be represented by elevations or indentations in the copy, and vice versa?

A. It will be reversed. The elevations of the master record will be represented by depressions in the duplicate record, and vice versa.

RE-CROSS EXAMINATION.

R-x-Q.37. Would, or would not the sinusoidal curve produced in the duplicate be the same sinusoidal curve as that of the master record?

A. It would be practically the same.

Frank L. Capps

UNITED STATES CIRCUIT COURT,
DISTRICT OF NEW JERSEY.
IN EQUITY.

AMERICAN GRAPHOPHONE CO.

vs.

UNITED STATES PHONOGRAPH CO. ET AL

On Patents 341,214 & 342,288.

AMERICAN GRAPHOPHONE CO.

vs.

UNITED STATES PHONOGRAPH CO. ET AL

On Patent 341,287..

ORDER AND AFFIDAVITS.

UNITED STATES CIRCUIT COURT,
DISTRICT OF NEW JERSEY.

AMERICAN GRAPHOPHONE COMPANY,	:	In Equity.
vs.	:	
UNITED STATES PHONOGRAPH COMPANY, ET AL.	:	On Patents 341,214
	:	and 342,288.

AMERICAN GRAPHOPHONE COMPANY,	:	In Equity.
vs.	:	
UNITED STATES PHONOGRAPH COMPANY, ET AL.	:	On Patent 341,287.

On reading and filing the affidavits of Edward D. Easton and Philip Mauro verified January 20, 1899, and after due consideration thereof, it is, on motion of counsel for complainant,

ORDERED that the defendants, United States Phonograph Company et al, show cause, if any they have, before this Court, at the United States Court Rooms, Post Office Building, Newark, N.J., on the *28th* day of January 1899, at *two* o'clock A. M., why an order should not be entered by this Court commanding the defendants, and each of them, to deliver up to the judicial custody to abide the result of the cause, all apparatus for making duplicate sound records, and all duplicate sound records, in the possession or under the control of said defendants or any of them, or in the alternative enjoining and restraining the said defendants and each of them, and their associates, attorneys, servants, clerks, agents and workmen, against selling, leasing, encumbering, or in anywise parting, either in whole or in part, with the title to and possession of all duplicate sound records and all apparatus for making duplicate sound records now owned, either in whole or in part, by said defendants or any of them, or in their possession or under their control, or in the possession or under the control of any

of them.

IT IS FURTHER ORDERED that, until the hearing and determination of this order to show cause, the said defendants and each of them, and their associates, attorneys, servants, clerks, agents and workmen, be and they hereby are enjoined and restrained from selling, leasing, encumbering, removing from their present location, or in anywise parting, ~~either in whole or in part,~~ with the title to and possession of ^{any} ~~any~~ duplicate sound records and ~~any~~ ^{any} apparatus for making duplicate sound records now owned, either in whole or in part, by said defendants or any of them, or in their possession or under their control, or in the possession or under the control of any of them.

in bulk or in any manner otherwise than as heretofore observed by them in the course of trade

IT IS FURTHER ORDERED that a copy of this order and of the affidavits upon which the same is made, be served upon the defendants or upon their solicitors on or before January 25th 1899.

Andrew Kirkpatrick

United States District Judge.

Newark, January 23, 1899.

U. S. CIRCUIT COURT, DISTRICT OF NEW JERSEY.

-----X
AMERICAN GRAPHOPHONE CO.,

- vs. -

U. S. PHONOGRAPH CO.
-----X

IN EQUITY

Suit on patent No. 341,214.

STATE OF NEW YORK, :

County of New York. :

: ss.:
:

E. D. EASTON, being duly sworn deposes and says:
I reside in Arcola, New Jersey, and am President of the complainant Company. On the 18th day of January 1899, I was informed by Leon F. Douglass of Chicago that the defendant, the U. S. Phonograph Co. was negotiating for the sale to him of all its record-making machinery, sound-records, etc., and that after personal investigation he had declined to make the purchase. He also informed me that defendant was negotiating with one T. E. Challenger of Philadelphia for the sale of said articles. From other sources I have learned that defendants, while protracting this suit, were making strenuous efforts to sell their property and assets, so that the end of the litigation might find them without any means to satisfy a judgment.

Immediately on receipt of this information from Mr. Douglass I instructed Mr. P. V. DeGraw of Philadelphia, to call upon Mr. Challenger and ascertain the facts regarding the proposed sale. I am to-day in receipt of a report from Mr. DeGraw stating that he saw Mr. Challenger who informed him that the report regarding his intended purchase of the defendants' Record-Making Plant was correct.

The proposed sale and delivery of the infringing machines and sound-records, if permitted will work great and irreparable injury to complainant. It will render futile the suit which complainant has been prosecuting with great diligence; if the infringing machines and records pass out of the jurisdiction of the Court complainant will be put to the expense of pursuing them and beginning the same proceedings elsewhere; it will be deprived of the relief to which, if it prevails in this suit, it will be entitled namely that the infringing devices be delivered up to the custody of the Court; and finally defendant will, by parting with its property, escape all responsibility.

E. D. Easton

Sworn to and subscribed, before me
this 20th day of January, 1899.

Elihu K. Camp,
Notary Public,
N. Y. C.



U. S. CIRCUIT COURT,
DISTRICT OF NEW JERSEY.

AMERICAN GRAPHOPHONE CO.)
)
 vs.) In Equity.
 U. S. PHONOGRAPH CO. et al.)

STATE AND COUNTY OF NEW YORK. ss:

PHILIP MAURO being duly sworn says:

I reside in Washington, D. C. and am of counsel for complainant herein. This suit has been diligently pressed by complainant in the desire to bring it to final hearing at the earliest day. Defendants, on the other hand, have sought and obtained several enlargements of its time for taking testimony, which is still uncompleted. Complainant's counsel have several times applied to the Court for orders limiting defendants' time. The last order limited their time to expire December 31, 1898. Defendants did not begin taking their expert testimony until December 21, 1898. On that day Mr. Vansize began his direct testimony, continuing with great prolixity, putting in the prior patents and literature used in previous cases, until December 30th, 1898. He is now awaiting the convenience of counsel for cross-examination. The expert deposition in the second case has not yet been begun.

The course pursued by defendants will necessitate a great deal of testimony in reply by complainant, and will result, in my opinion, in a record of at least a thousand

pages. It will therefore be physically impossible for this case to be brought to final hearing for many months to come.

Philip Mauro.

Sworn and subscribed to before me
this 20th day of January, 1899.

Elisha K. Camp,
Notary Public,
N. Y. Co.



UNITED STATES CIRCUIT COURT,
DISTRICT OF NEW JERSEY.

AMERICAN GRAPHOPHONE COMPANY

-vs-

UNITED STATES PHONOGRAPH COMPANY et al.:

:
:
: IN EQUITY.
:
: On Patents 341,214
:
: and 341,288
:
:

AMERICAN GRAPHOPHONE COMPANY

-vs-

UNITED STATES PHONOGRAPH COMPANY et al.:

:
:
: IN EQUITY.
:
: On Patent 341,287.
:
:
:
:

STATE OF NEW JERSEY:

:SS.

COUNTY OF ESSEX :

HOWARD W. HAYES being duly sworn according to law on his oath says: I am one of the solicitors of the defendant United States Phonograph Company in the two above entitled causes, and am familiar with the affairs of the Company. I am familiar with the transactions carried on between Mr. S. S. Ott, the former President of the Company and Leon F. Douglas, and between Mr. Ott and T. Earle Challenger of Philadelphia. I make this affidavit because Mr. Ott, the only other person connected with the Company having knowledge of the transactions is now at Denver, Colorado. He left Newark before the papers in this case were served. There is no intention whatever on the part of the United States Phonograph Company or of any of its officers to dispose of its stock in trade in any way other than ordinary course of business and no intention whatever to dispose of the

chines used for making duplicate records. The Company insist that it would have a perfect right so to do, but has no intention of exercising that right. Mr. Douglas made an offer to the Company for all of its stock in trade, including those used for making duplicates, but that offer was refused. The negotiations with Mr. Challenger consisted in the sale of certain shares of stock in the Company to him. This sale has been carried out.

Sworn to and subscribed :
: :
before me this 7th day :
: :
of February, A.D.; 1899 :
: :
at Newark, N.J. :
:

Howard W. Hayes

F B Stewart

*Notary Public
of New Jersey*

UNITED STATES CIRCUIT COURT,
DISTRICT OF NEW JERSEY.

AMERICAN GRAPHOPHONE COMPANY

-against-

UNITED STATES PHONOGRAPH COMPANY.

)
)
) On Patent

)
) No. 341,287.
)

TESTIMONY taken on behalf of the defendant,
United States Phonograph Company, before S.D. Oliphant,
Esq., pursuant to agreement, at the office of W. B.
Vansize, Esq., No. 253 Broadway, New York City, on
Wednesday, May 17th, 1899.

Present, Howard W. Hayes, Esq.,

for defendant;

C.A.L. Hassie, Esq.,

for complainant.

WILLIAM B. VANSIZE, a witness produced on behalf of
defendant, United States Phonograph Company, being
duly sworn, deposes and says:

Q.1. What is your name, age, residence and occu-
pation?

A. William B. Vansize; 46 years of age; I reside
in the City of Utica, Oneida County, New York; my office
and place of business is at No. 253 Broadway, New York
City. I am a solicitor of patents and have frequently
testified as an expert in contested patent cases in the
United States courts.

Q.2. Please state generally the nature of your studies, observations and experience, which enable you to testify as an expert, and particularly such as qualify you to so testify in a suit involving machines for recording and reproducing sound records, and mechanical and other duplicates or copies of such sound records, used in connection with phonographic apparatus?

A. Since 1869 I have been continuously employed in arts involving the use of light machinery. At the time stated I learned telegraph operating and was continuously engaged for eight or ten years in the telegraph business. In 1879 I moved to New York City, having been admitted to the bar, and was employed in the executive offices of the Western Union Telegraph Company. Soon after this I was specially employed in the investigation of patented apparatus and machinery and made it my business to fully inform myself regarding the subject-matter contained in scientific periodicals and the issues of patents in the United States and Great Britain relating to the telegraph, the telephone, the phonograph, electrical apparatus generally, and kindred subjects. Just before this time, while located in Albany, New York, I had assisted in the introduction to the public of the Bell telephone and Edison's phonograph. In 1884, I entered the employ of the American Bell Telephone Company at Boston, and made myself familiar with their factory processes and laboratory experiments, while I continued to keep myself informed from scientific literature and

patents regarding all the matters above referred to by me. In 1886 I returned to New York city and have been since then continuously employed by corporations and individuals engaged in manufacturing and introducing to the public various forms of electrical apparatus and light machinery, securing patents therefor, investigating the validity of issued patents, and testifying as an expert witness in numerous patent controversies in the United States courts, involving electrical apparatus and machinery. I have kept myself informed in a general way regarding the commercial demand and supply with respect to machinery for recording and reproducing sound and believe that I am at the present time well informed regarding the matter. In 1894 I was employed by the United States Phonograph Company to investigate the scope and validity of existing United States patents on sound-recording and reproducing apparatus, and for this purpose I made a thorough investigation of the art at that time. Since the time referred to I have kept myself informed regarding the matter and early in the year 1898 I was employed and directed to investigate the merits of the present controversy. I made an affidavit which was used by the present defendant as part of its record in a preliminary motion in a contemporaneous suit, founded on patent No. 341,214, and I have recently testified in the suit referred to, my testimony forming part of defendant's record.

Q.3. Please state whether you have examined and understand Letters Patent of the United States, No.

341,287, issued May 4, 1886, to Sumner Tainter, for
Improvements in Recording and Reproducing Sounds?

A. Yes, I have examined the patent referred to
and believe that I understand it.

Q.4. Please look at said U.S. patent No. 341,287,
and state whether or not, in your opinion, that patent
shows and describes an operative arrangement of apparatus,
or machinery, for recording, or reproducing, or duplicating
sound or sound records. In giving your answer please
state your reasons for any opinion you may express?

A. The main and essential characteristic of this
patent is the production by mechanical means of a copy
of a sound record in magnetic metal. I quote from the
specification, page 1, column 1:

"This invention relates to the reproduction,
through the action of magnetism, of sounds by means
of records in solid substances. For this purpose
it is necessary, first, to prepare the record in a
suitable material, (magnetic or diamagnetic). The
material specially adapted to the purpose is of
course iron, (using the word broadly as including
steel and various grades of iron.) Owing to the
hardness of iron, it is not practical to cut the
record directly therein by means of a cutting style
vibrated by the action of the voice

"According to the present invention the record
is first cut in a comparatively soft material,
(preferably wax or a waxy composition,) and from an
electrotype of this or from other suitable record
a copy is made in iron, ^{or other suitable material} by means of a graver or cutting-
style which is actuated by the record to be copied.
The wax would not ordinarily have sufficient strength
to withstand the pressure to which it would be sub-
jected in cutting the metal, and for this reason
the electrotype is made.

"Another method of preparing a magnetic record
would be to place a thin film of iron upon an elec-
trotype taken from the wax or other suitable record."

It is to be noticed that the specification dwells
upon and emphasizes the necessity for this iron record.

and that it immediately proceeds with the statement that it is necessary to provide means sufficiently sensitive to respond to the record. I again quote from the specification:

"Having prepared a suitable magnetic record, it is necessary to provide means sufficiently sensitive to respond to the record. Heretofore it has been proposed to attach a magnetized needle to a diaphragm, and to support the latter so that the point of the needle is in close proximity to the record. . . . In the present invention, in addition to the means before stated for improving the quality of the record, means are provided for increasing the sensitiveness of the receiving-instrument.

"Instead of depending wholly upon the permanent magnetism of the needle, one or more inducing-magnets are employed, and the record itself is or may be rendered magnetic by induction or permanently. It is also found that excellent results can be obtained by inducing currents in an electric circuit, which includes a receiving-telephone. For this purpose a coil should surround the reproducing needle."

Referring to the drawings, it is stated that Figs. 1 and 2 show the apparatus "for engraving the iron record"; Figs. 11 and 12 illustrate the copying tools, the electrotape, "and the iron tablet on which the record is to be made". Figures 4 to 10 inclusive, illustrate electric and electromagnetic apparatus constructed in accordance with the invention for reproducing sound; Figure 13 "is an illustration of an iron record in perspective and section, the point of the reproducing needle being shown in position." Continuing, the ~~xxx~~ specification states:

"In preparing the iron record according to the best mode to me known, the record is first cut in wax or a waxy composition, as described in the heretofore mentioned application; but the cutting-style, which is attached to a vibratory diaphragm, has preferably a flat or chisel-like point, so that the

recording tablet is engraved with a spiral groove of trapezoidal cross-section, the elevations and depressions at the bottom of the groove representing the forms of the sound waves which act successively upon the diaphragm of the recording instrument.

. From this original wax record an electrotpe is taken in copper by known methods - that is to say, the surface of the wax is coated with black lead, or is otherwise rendered conductive, and is then placed in an electroplating cell. The electrotpe, when of sufficient thickness say twenty-five one-thousandths of an inch (.025 ") is removed from the wax and mounted on a backing, with a thin layer of plaster interposed."

This electroplate is shown in the form of a thin disc; the iron plate to receive the ultimate record is of iron in the form of a disc. These two discs are arranged in parallel planes, machinery is provided to rotate them together, or synchronously, and a reciprocating bar having a tracing point on one end and a cutting tool on the other, the first end traveling in the line of the record in the electrotpe, and the second scraping a spiral line on the iron disc, together with a carriage gradually changing its radial distance from the center of the disc, is the mechanism employed for producing the third copy of the record, which is the ultimate copy, so far as the patent specification extends. It is to be noticed that these two discs must be in absolute mathematical parallelism. To secure this, the specification describes the use of plaster-of-paris in the form of an emulsion, employed to back up the electroplate disc, but any mechanic knows that this would be almost impossible of attainment, and any failure of absolute accuracy would cause that reciprocating bar to be jammed between the two discs at points where the separation is less than the maximum

and to fail to contact at points where the extent of separation is greater than the minimum. When the cutting tool is jammed, the rotation must stop, or something must give way. In Figures 7 and 8, a cylindrical form of duplicate is indicated in cross-section, but you cannot make an electroplate from a cylindrical record that shall bear upon its exterior a copy of the indented line made by the original recording tool. The patent shows and describes the disc record, the disc duplicate, and only the disc form, and the reciprocating ~~tool~~ cutting tool and tracer shown and described is a mechanical impossibility in practical work.

The refinement of adjustment necessary with the use of the mechanism described, is continued in the electromagnetic devices for reproducing the sound in telephonic apparatus, which is the only means of reproduction shown and described. By moving a magnet in the vicinity of magnetic material, or vice versa, it is possible to secure movement of the member of the combination which is not fixed, and by moving a magnetic metal in the field of a magnet, the magnetic equilibrium is disturbed. The line representing a sound record in this iron copy - iron disc, is of microscopical proportions, and the variations in the magnetic effect ~~xxx~~ between the highest point and the lowest point in this groove would be almost inappreciable. Yet it is proposed that this variation shall influence by induction either a magnet or a magnetic material so that the telephone will respond to render

audible the minute variations. But how can you possibly mount the disc of magnetic metal so that it will run with sufficient accuracy? It cannot be done by any ordinary means. You cannot mount it so that its variation as it rotates will not be greater than the variation in the depth of the groove corresponding to the sound record. The apparatus for reproducing from this magnetic disc purporting to be a duplicate of the sound record, is purely theoretical, utterly impracticable, and inoperative for any useful purpose.

I am of the opinion, for the reasons stated, that the patent does not show or describe an operative arrangement of apparatus or machinery for recording, or reproducing, or duplicating.

Q.5. Please briefly describe the state of the art existing prior to August 29th, 1885, as shown and described in such prior patents and printed publications as you may refer to, relating to the recording and reproduction of speech and other sounds, and the duplication or ~~making~~ copying of sound records by mechanical or other means?

A. The art of reproducing audibly a record of sound, whether vocal or instrumental, dated from the ~~exact~~ description and introduction of the phonograph of Thomas A. Edison in 1877 or 1878. When Edison made his invention, the prior art disclosed a graphic record of sound, but this was not reproducible audibly. This graphic record was made by the Scott's phonautograph. A good description occurs in the Scientific American, published

in New York, December 15, 1877, at page 376. I quote from the article.

"For this purpose a rotating copper cylinder c is covered with lampblack paper and the style is brought in contact with the latter so that when the cylinder is rotating and the style vibrating, a sinuous line is produced, the nature of which depends upon the sound."

The recorder is described in the following language:

"In Fig. 6 is represented Leon Scott's phon-autograph which consists of an ellipsoidal cast A of plaster-of-paris, and about one and a half feet long. The end A is open, that at B is closed by a solid bottom having an orifice, in which is a bent brass tube a which carries a ring on which is affixed a thin membrane. Near the center of the latter is a very light style, and in order that this style may not be at a node, the membrane stretching ring carries a movable piece i, which is termed a subdivider, and which, being made to touch the membrane first at one point, and then at another, enables the experimenter to alter the arrangement of the nodal lines at will. It follows, that, when a sound is produced near the apparatus, the air in the ellipsoid, the membrane and the style, will vibrate in unison with it and it only remains to trace on a sensitive surface the vibrations of the style and to fix them."

The drawing indicates that the style operated to engrave upon the surface of the paper cylinder a sinusoidal line like a snake track, the full depth of the coating being removed and the variations in the record due to the variations in amplitude of the sound waves are represented by greater or less excursions of the point of the recording style upon one side or the other of a straight line. The material, lamp black, in which this record was cut or engraved, was undoubtedly too soft to permit of its use as a means for direct reproduction, of audible effects.

The Scientific American, November 17, 1877, contains a communication from a co-worker of Mr. Edison giving the

earliest intimation of Edison's work. This describes a speaking tube provided with a mouth-piece, a metallic diaphragm, which responds to the vibrations of the voice; in the center of the diaphragm "is secured a small chisel shaped point"; a drum revolved by clock-work serves to carry forward a continuous fillet of paper having throughout its length and exactly in the center a raised V-shaped boss, such as would be made by passing a fillet of paper through a Morse register with the lever constantly depressed. The chisel-point attached to the diaphragm rests upon the sharp edge of the raised boss. If the paper be drawn along rapidly all the movements of the diaphragm will be recorded by the indentation of the chisel-point on the delicate boss - it having no support underneath it is very easily indented. To do this, little or no power is required to operate the chisel, the tones of small amplitude will be recorded by slight indentations, and those of full amplitude by deep ones.

The reproducer is very similar to the indenting apparatus, except that a more delicate diaphragm is used. The reproducer has attached to its diaphragm a thread which in turn is attached to a hair spring upon the end of which is a V-shaped point resting upon the indentations of the boss. The passage of the indented boss underneath this point causes it to rise and fall with precision, thus contributing to the diaphragm the motion of the original one, and there by rendering the words again audible.

This arrangement of a "reproducer", what we now call a reproducing apparatus, was the essential novel feature of Mr. Edison's invention. He provided a delicate form of reproducer which would not rub out the record, a device applicable to the reproduction of an audible sound record, however that sound record might be made.

It is proper to explain that the use of the terms "indenting", "indentations" and "indented", refer to the form of the record of a sound or a series of sounds. Referring to Webster's Dictionary, the word "indent" is defined "to notch; to jag; to cut into points like a row of teeth." "Indentation" is defined as "a recess or sharp depression in any surface". "Indented" is defined as "Cut in the edge into points or inequalities like teeth; jagged; notched; stamped in; dented on the surface." I understand the writer of this letter and Mr. Edison in his patents, used these terms with the dictionary signification quoted, and these words sequented did not define the method or apparatus by which the indentations were produced. In the case of the description by Mr. Johnson, the embossed rib on the strip of paper was undoubtedly cut into indentations. At any rate that is true so far as scraping and cutting can be considered the same operation. The instrument employed was a chisel point.

United States Letters Patent No. 200,521, dated February 19, 1878, issued to T.A. Edison, shows and describes Edison's reproducer and recorder as subsequently

employed by him. I have copied the drawings of the patent, and ask that the sheet be inserted here for reference.

The specification states:

The invention consists in arranging a plate, diaphragm, or other flexible body capable of being vibrated by the human voice or other sounds, in conjunction with a material capable of registering the movements of such vibrating body by embossing or indenting or altering such material, in such a manner that such register mark will be sufficient to cause a second vibrating plate or body to be set in motion by them, and thus reproduce the motions of the first vibrating body."

The specifications and drawings describe and show a small form of lathe machinery having a screw feed. The arbor carries a cylinder with a helical groove in its surface. This has a motion of rotation and also of longitudinal progression. Upon the surface of the grooved cylinder there is a sheet of metal foil. The recorder consists of a speaking tube or mouth-piece adjustably supported on its standard.

"Upon the end of the tube or mouth-piece is a diaphragm, having an indenting point of hard material secured to its center, and so arranged in relation to the cylinder A that the point will be exactly opposite the ~~groove~~ groove in the cylinder at any position the cylinder may occupy in its forward rotary movement."

The reproducer is described as follows:

"C is a tube similar to B, except that the diaphragm is somewhat lighter and more sensitive, although this is not actually necessary. In front of this diaphragm is a light spring D having a small point shorter and finer than the indenting point on the diaphragm of B. This spring and point are so arranged as to fall exactly into the path of all the indentations. This spring is connected to the diaphragm P of C by a thread or other substance capable of conveying the movements of D."

The operation of recording is described as follows:

The tube B is then adjusted toward the cylinder until the indenting point touches the material and indents it slightly. The clock-work is then set running and words spoken in the tube B will cause

the diaphragm to take up every vibration, and these movements will be recorded with surprising accuracy by indentations in the foil."

The operation of the reproducer is described as follows:

"Now when the cylinder is allowed to rotate, the spring D is set in motion by each indentation corresponding to its depth and length. This motion is conveyed to the diaphragm either by vibrations through a thread or directly by connecting the spring to the diaphragm F, and these motions being due to the indentations, which are in exact record of every movement of the first diaphragm, the voice of the speaker is reproduced exactly and clearly, and with sufficient volume to be heard at some distance."

Edison provided this reproducer as a separate instrument, but the recorder could be used as a reproducer also, and he so describes it. He also describes the detachment of the indented record, its preservation ^{for} ~~from~~ any length of time, its replacement, and reproduction from it. He also provides that,

"The record, if it be upon tinfoil, may be stereotyped by means of the plaster-of-paris process, and from the stereotype multiple copies may be made expeditiously and cheaply by casting or by pressing tinfoil or other material upon it. This is valuable when musical compositions are required for numerous machines."

That is a description of one form of the duplicating process.

The Edison patent describes a modified arrangement in which a wide continuous role of material is used, the recording device being reciprocated backward and forward over the role as it passes forward:

"or a narrow strip like that in a Morse register may be moved in contact with the indenting point, and from this the sounds are reproduced. The material employed for this purpose may be soft paper saturated or coated with paraffine or similar mate-

rial, with a sheet of metal foil on the surface thereof to receive the impression from the indenting point."

I understand that to be a use of paper coated with a wax or wax-like material, and that the sheet of metal foil was described for application to the surface of the wax to prevent clogging of the recording point, and to prevent particles of dust and dirt getting in the surface of the wax and interfering with the record.

Adjourned to Thursday, May 16, 1889, 10 A.M.

New York, May 18th, 1899, 10. A.M.

Met pursuant to adjournment.

Present, counsel as before.

DIRECT-EXAMINATION OF W. B. VANSIZE: continued.

The patent specification continues:

"I do not wish to confine myself to reproducing sounds by indentations only, as the transmitting or recording device may be in a sinuous form, resulting from the use of a thread passing with paper beneath the pressure rollers t, such thread being moved laterally by a fork or eye adjacent to the roller t and receiving its motion from the diaphragm G with which such fork or eye is connected, and thus records the movement of the diaphragm by the impression of the thread in the paper to the right and left of a straight line, from which indentation the receiving diaphragm may receive its motion and the sound be reproduced substantially in the manner I have already shown."

I understand that to be a description of the application of the reproducer to render audible a sound record existing in the form of a sinusoidal line or grooves, like the graphic record of the Leon Scott phonautograph, providing only that the record has sufficient mechanical strength.

This Edison patent also describes a raised or superposed record, a record due to the use of a pen and ink, the pen being influenced by a vibrating diaphragm connected with it so as to apply more or less ink to the moving strip of paper. The reproducer or reproducing apparatus is described as a means to render this form of record audible.

We have, then, in the Edison patent, three or more arrangements of the sound record. There is the indented record in which the recording style operates to form a

groove with sloping walls having variations in the depth, such is the record made in the tinfoil and in the paraffine and paper. We have the sinusoidal indentation and we have the raised or elevated indentation. But with each and all of these records the reproducing device or apparatus forming the essential feature of novelty and merit in Edison's invention, was described for use and was more or less useful. That is to say, you can use Edison's reproducing apparatus with any of these various forms of sound record, provided only that they have sufficient mechanical strength to vibrate the diaphragm.

British Letters Patent No. 2909 of 1877, to T.A. Edison sealed October 20th, 1877, shows and describes, among other things, the forms of apparatus described in the United States patent corresponding thereto, last above referred to, and the illustrations are somewhat more graphic and detailed. I have caused to be made a facsimile of the drawings and ask that they be inserted at this point for ready reference.

I quote from page 6, line 35:

"I am enabled to record the sounds produced by the human voice or otherwise, by causing the movements of the diaphragm to be registered on paper or soft sheet metal, and then the paper may be used in an instrument to reproduce the sound upon a delicate diaphragm by giving to the same a vibration similar to that originally given by the voice.

"h, Fig. 4, is the indenting transmitter, the diaphragm having a knife-edge point. 1 is the paper which has previously been passed through a machine to raise a V-shaped rib 6. The movement of the diaphragm h, when the drum is in motion, causes the knife-edge point 1 to indent the raised rib to varying depths, according to the amplitude of vibration of the diaphragm, thus these indentations represent accurately all the tones and varying inflexions of the human voice. The paper after being indented is ~~as~~ passed through a second apparatus n, Fig. 5, almost similar to h. A spring 9 has a knife edge which rests upon the raised and indented rib 6, the spring being connected to a delicate diaphragm 10 by a string or straw.

"The indented rib reproduces in the spring 9 the movement of the indenting point, and either by direct action or through the vibration of a string conveys the same motion to the diaphragm of n and reproduces previous sounds. The sound may be recorded in ink as represented in Fig. 7. The diaphragm of h operates a very flexible self-feeding pen g, and causes the continuous line to be wide or narrow according to the amplitude of vibration of the diaphragm. The ink used should dry quickly, and the strip may be passed at any time thereafter through the instrument shown in Fig. 8, beneath the arm 12, having a point or points resting on the paper; this arm is connected with a resonant diaphragm, and the ink-marks produce more or less friction, according to the breadth and amount of ink deposited, and this will set the diaphragm of n vibrating, and reproduce the vibrations of the diaphragm of h.

"A convenient form for the sound-recorder or phonograph is to employ a cylinder 61, see Fig. 29, having a helical groove in its surface covered with tinfoil, and the cylinder is revolved regularly by clock-work and moved endwise by a screw on its shaft, so that the indenting point 1 from the diaphragm 10 of h will be always in line with such groove, hence the vibrations in the diaphragm will be recorded by indenting the foil into the groove, and hence the same sounds will be reproduced by the point 12 of the hearing instrument ~~xxx~~ n, giving to the diaphragm n the motions that result from the indentations of the foil moving in contact with such point."

I understand that British patent of Edison to describe several forms of record tablet with sound records indented therein either by embossing or cutting or superposing a material, of suitable character, and that in each and every case the reproducing device shown and described by Edison is effective to render audible the sound record.

Nearly contemporaneous with the publication of Edison's invention, a French serial publication, known as *Le Pappel*, issued December 11, 1877, No. 2832, contained a description of the improvements of a Frenchman named Gros, to be materialized by the instrument maker Praguot.

I quote from the article referred to:

"Are we the institution to hold back our encouragements to that has been a success? The construction of the instrument in which the idea will be materialized has been proposed to Mr. Praguot, Jr., who became very much interested.

"The registering of the voice will be effected on a revolving and recording cylinder, which will be coated with a plastic substance such as paraffine; the lines will be gouged out on the same by an index actuated by a lever with unequal arms which will amplify its movements. (The italics are mine) Then these lines will be changed into a metallic plate by the galvano-plastic process. 'I forced the possibility,' writes the author to us, 'of covering the cylinder with a fatty coating which would permit of cutting out the lines by an acid.'"

"But I note that the desire of showing that 'the matter is getting on well' has somewhat disarranged the line of order we should follow, and our description is a little enigmatical. Let us therefore give the key to the same.

"Let us turn back to the play toy, that childish logophone, that strange speaking tube, known doubtlessly, although its invention is still recent, by the greater part of the readers, of whom it will have puzzled a few. Two tubes, open at one end, closed at the other by means of a stretched membrane, and pierced with a central hole, are connected together by a string, or better by a wire, passed at its two ends into the hole of the membrane, where it is held by a knot. Such is the instrument

when at rest. This is it in action: Let one person talk into one of the tubes, whilst another one ~~xxxxxx~~ places the other tube to his ear, the latter will distinctly hear the words pronounced, the songs sung or whistled by the other. However, two things are clear; the first, that the sounds heard by the listener are produced in the acoustic tube by the membrane placed before the ear; the second, that the movements of this membrane are themselves produced by a rapid succession of ~~trac-~~ tions effected by the wire, which tractions are unequally intense and unequally long in duration.

"Let us consider any point of this wire; this point is thus subjected to a succession of reciprocal movements of variable amplitude, more or less fast, but always being produced in the same rectilinear direction.

"The simplicity of such movements renders their registration easy. Let us suppose that a pen-point, a piece of tinsel, or any other very light index, were attached to the thread and dragged in a surface having a rapid and regular movement. This surface is of glass blackened over a lamp. This said, there only remains to announce the following facts, which are: If the wire is at rest, the index will trace a simple line; if the wire has a reciprocal movement, the index will trace an undulating line; the more amplitude this reciprocal movement these vibrations will have the more undulations will differ from the simple line; the more rapid these vibrations the closer will be the undulations. Consequently, all the conditions of the movement of the wire will have been registered - stereotyped.

"This surface of a blackened glass thus scratched, what is it, in fact, if not the copy of a succession of the sound phenomena produced in a given time. Now, the final object of a plate is to give proofs, How will its sound proof be drawn from this one?

"But there is really only the embarrassment of the ~~xxxxxx~~ choice. All sorts of processes, in fact, permit of transforming these open lines on the black ground of the glass into similar lines dug into a metal, into steel, if you desire it. The operation offering neither difficulty nor novelty, it is useless to linger over details.

"Once this change effected into lines hollowed out into steel, the steel plate will be put in the same place where the blackened piece of glass was when it received the impression of the index. For this light index, pen, or tinsel will be substituted a hard index of wood, ivory, or of a metal softer than steel, so that it does not harm the plate, and this new index will be held by a spring in the grooves of the lines dug out on the plate.

"This done, This plate is given the same movement which, during the registration of the sound phenomena, was given the registering surface."

I understand that description to embody the cutting of the record in the paraffine wax coating of a turning and progressing cylinder, and that a system of duplication is described, the duplication to be produced in hard metal.

Of course the necessity for these hard-surfaced duplicates was to avoid the deformation of the wax record which would occur when an Edison reproducer was passed over it.

I notice in reading testimony referring to this Le Rappel article that the complainant is not entirely satisfied with the translation introduced by the defendant so far as the following passage, or part thereof, is concerned:

"The registering of the voice will be effected on a turning and progressing cylinder, which cylinder is coated with a plastic substance such as paraffine; the lines will be gouged out on the same by an index actuated by a lever with unequal arms."

The dispute seems to occur over the phrase, "the lines will be gouged out". The French corresponding with this passage is as follows: "les traces s'y marqueront en creux". "Marqueront" is a form of the verb "marquer", defined as "to mark; to stamp." The noun "creux" is defined as "hollow, cavity, pit, hole, chasm, gutter". The verb "creuser" is defined "to dig, to hollow, to scoop". These are all well known dictionary definitions or equivalent expressions for the respective words.

I do not profess to be a French scholar, but my opinion,

founded upon the definitions quoted, is that the translation containing the words "gouged out" is peculiarly accurate and should be considered satisfactory.

Scribner's Magazine for April, 1878, at page 855, contains a description of a form of Edison's phonograph that was placed upon the market. I quote:

"In its simplest form, the speaking phonograph consists of a mounted diaphragm, so arranged as to operate a small steel stylus placed just below and opposite its center, and a brass cylinder, Figure 12, six or more inches long by three or four in diameter, which is mounted on a horizontal axis extending each way beyond its ends for a distance about equal to its own length. A spiral groove is cut in the circumference of the cylinder, from one end to the other, each spiral of the groove being separated from its neighbor by a bout one-tenth of an inch. The shaft or axis is also cut by a screw thread corresponding to the spiral groove of the cylinder, and works in screw bearings, consequently when the cylinder is caused to revolve, by means of a crank that is fitted to the axis for this purpose, it receives a forward or backward movement of about one-tenth of an inch for every turn of the same, the direction, of course, depending upon the way the crank is turned. The diaphragm, Figure 13, is supported by an upright casting capable of adjustment, and so arranged that it may be removed altogether when necessary. When in use, however, it is clamped in a fixed position above or in front of the cylinder, thus bringing the stylus always opposite the groove as the cylinder is turned. A small, flat spring attached to the casting extends underneath the diaphragm as far as its center and carries the stylus, and between the diaphragm and spring a small piece of india rubber is placed to modify the action, . . .

"The action of the apparatus will now be readily understood from what follows: The cylinder is first very smoothly covered with tinfoil, and the diaphragm securely fastened in place by clamping its support to the base of the ~~instrument~~ instrument. When this has been properly done, the stylus should lightly press against that part of the foil over the groove. The crank is now turned, while, at the same time, some one speaks into the mouthpiece of the instrument, which will cause the diaphragm to vibrate and as the vibrations of the latter correspond with the movements of the air producing them, the soft and yielding foil will become marked along the line of the groove by a series of indentations

of different depths, varying with the amplitude of the vibrations of the diaphragm; or, in other words, with the inflexions or modulations of the speaker's voice. These inflexions may therefore be looked upon as a sort of visible speech, which, in fact, they really are. If, now the diaphragm is removed, by loosening the clamp, and the cylinder then turned back to the starting point, we have only to replace the diaphragm and turn in the same direction as at first, to hear repeated all that has been spoken into the mouth-piece of the apparatus; the stylus by this means, being caused to traverse its former path, and consequently, rising and falling with the depressions in the foil, its motion is communicated to the diaphragm, and thence through the intervening air to the ear, where the sensation of sound is produced.

"The sheet of tinfoil or other plastic material receiving the impressions of sound, will be stereotyped or electrotyped so as to be multiplied and made durable, or the cylinder will be made of a material plastic when used, and hardening afterward. This sheets of papier mache or of various substances which soften by heat, would be of this character. Having provided thus for the durability of the phonograph plate, it will be very easy, to make it separable from the cylinder producing it, and attachable to a corresponding cylinder anywhere and at any time. There will doubtless be a standard of diameter and pitch of screw for phonograph cylinders. Friends at a distance will then send to each other phonograph letters, which will talk at any time in the friend's voice when put upon the instrument. Certainly xxxxx@xxxxxxx within a dozen years, some of the great singers will be induced to sing into the ear of the phonograph, and the electrotyped cylinders thence obtained will be put into the handorgans of the streets, and we shall hear the actual voice of Christine Nilsson or Miss Cary ground out at every corner. It will supersede the shorthand writer in taking letters by dictation and in the taking of testimony before referees. Phonographic letters will be sent by mail, the foil being wound on paper cylinders of the size of the finger. "

I understand that to be a description of the Edison phonograph apparatus designed to use tinfoil or some plastic material to make the sound record upon, a form of which apparatus was commercially used with tinfoil at or about the date of the article. The rehearsal of the various used to which the phonograph and its reproducible record

may be put is instructive, as it includes practically all the uses to which the phonograph of the complainant is alleged to be applicable. It is to be noticed that in this article it is contemplated that while stereotype and hard metal reproductions and duplicates of the sound record shall be made and used, it is also intended that the original shall be used with a suitable reproducer for rendering the record audible.

Counsel for defendant now states that since asking question 5, his attention has been called to the fact that a stipulation has been entered into that testimony taken in case now pending in this court between the same parties on patents No. 341,214 and 341,233, may be used in this case. He therefore suggests to witness that it will be unnecessary for him to repeat any matters already testified to by him in the said case on patents 341,214 and 341,233.

suggestions

In view of the ~~instructions~~ of counsel I will summarize the subsequent statements occurring in my answer to the 5th question in the concurrently pending suit referred to.

The Scientific American, July 23, 1873, Volume 38, No. 4, page 60, contains a letter from a correspondent describing the use of a cutting style in a phonographic apparatus.

The Popular Science Monthly, for April, 1873, con-

tains a communication from Dr. Mayer to the effect that he has received from Mr. Edison a sheet of copper foil containing a sound record with information that sound records have been made on a cylinder of soft Norway iron, and the sonorous vibrations reproduced therefrom.

The Journal of the Franklin Institute for July 1882, contains a paper read at a meeting of the Institute, May 17, 1882. There is described the employment of a circular saw or a small burr rapidly revolved at right angles to a progressing strip, plate or cylinder, against which it is pressed by the pulsations of a diaphragm.

The Brooklyn Times, published in 1878, describes an exhibition made at Edison's laboratory in which a sheet of copper, one-thirtieth of an inch thick, wrapped around the phonograph cylinder had been used to receive the record of a needle point vibrated by the sound waves due to a music box. The record was cut or engraved.

British Letters Patent no. 1644 of 1878 to Edison describes modifications of Edison's phonograph in which the record tablet consists of metal foil, tin, iron, copper, lead, zinc, or an alloy, and ~~the~~ paper or other materials may be used, coated with paraffin or other hydro-carbon, waxes, gums or lacs, and the sheet so prepared may itself be indented, or the material, ~~say~~ say paper, may be made to pass through a bath of hot paraffine. Thin metal foil ~~is~~ or may be placed on the material last described, and the sheet passed through rollers which give it a beautiful smooth surface. The patent describes two forms of record tablet, one com-

posed of paper with a coating of paraffine or other hydrocarbons, waxes or gums, and a second form in which there is employed paper coated with paraffine, and thin metal foil. It is to be noted that the use of the term "indented" is as I have heretofore described it, the word "indent" is defined in the dictionary "to cut into points, like a row of teeth". The word "indent" and its various forms "indented" and "indentations" were used by Mr. Edison as descriptive of the waves of the resultant sound record, and were not in any way indicative of the method of making the record. With the recording point described and shown by Edison, in the patent under consideration, and in other of his patents, controlled by a vibrating diaphragm, the method ^{of} recording is susceptible of definition only by reference to the material upon which the record is made. The indentations in the metal foil were embossed, the indentations in the paper coated with paraffine wax were cut or engraved, gouged out or ploughed out. The passage of the material past the style, or the passage of the style across the surface of the material, in the case of the foil, will raise a rib on the reverse side, and upon the upper side it presents a depression, or a series of depressions having sloping side walls varying in breadth and in depth with the amplitude of the sound vibrations. The same style used in connection with paper coated with paraffine or wax or a composition of wax and paraffine, under exactly the same conditions, results in cutting or engraving, as I have

described.

In order that there may be no chance to dispute this fact, I have caused to be made a form of phonograph described in the Edison patents No. 200,521, February 19, 1878; No. 227,073, May 13, 1880; Scribner's Magazine April 1878, pages 355-357; British patent 2309 of 1877, and 1644 of 1878. This instrument consists of a metal cylinder having a helical groove. It is located upon a mandrel rotating in bearings. The mandrel is screw threaded and there is a hinged half-nut and cam lever in position to throw said nut into engagement with the screw thread on the mandrel. At one end of the mandrel is a heavy fly-wheel, and a crank handle by which the shaft or mandrel bearing the grooved cylinder can be uniformly rotated. I have placed upon the cylinder covering approximately half its surface, a sheet of tinfoil, and I have caused to be embossed a sound record thereon, upon the other and complementary half of the cylinder I have placed a record tablet consisting of a paper foundation coated with a layer of beeswax and paraffine one to two by weight, as described in U.S. patent No. 341,214. By adjusting the position of the described diaphragm and recording point with respect to the surface of wax and paraffine, I am able to produce the same record in all respects similar to that made upon and reproduced from the tinfoil, - with this difference: that in recording upon the wax and paraffine record the result of the operation is the removal of the material by a cutting, gouging or graving action of the vibrating style, and the

record is found to be engraved or cut. In the case of the tinfoil record, as also in that of the wax and paraffine record, the record appears in the form of a groove with sloping walls, the sound waves being represented by elevations and depressions at the bottom of the groove.

The recording point employed with the diaphragm furnishes a satisfactory means for reproducing from both records.

Defendant's counsel offers in evidence the phonograph apparatus referred to by the witness, and the same is marked "Defendant's Exhibit Vansize Phonograph No. 1, S.D.O., Ex., May 18, 1899"

Defendant's counsel offers in evidence the tinfoil record tablet described by the witness, and the same is marked "Defendant's Exhibit Vansize Tinfoil Record, S.D.O., Ex., May 18, 1899".

Defendant's counsel offers in evidence, the wax and paraffine coated paper tablet described by the witness, and the same is marked "Defendant's Exhibit Vansize Wax and Paraffine Record S.D.O., Ex., May 18, 1899."

French Letters Patent No. 124,213, of 1878, delivered July 27, to Charles Cros, for New Methods in Phonography, refers to certain prior issued patents of Mr. Edison. It also contains a general resume of the state of the art. It describes a sound record in the form of a sinusoidal

elevated line, originally engraved in lamp black, forming a coating on a glass plate. A modified sound record is described which consisted in substituting tallow or paraffine as a coating for the record surface on the metallic plate, causing the diaphragm to cut or engrave a sinuous sound record; that is, one in which the variations in amplitude and vibration are represented by lateral excursions of the recording point as distinguished from vertical excursions entering more or less deeply into the recording material. An acid is caused to eat into the metal backing whereby the sound record is etched in a well known manner. Of course the well known reproducer described by the Edison patent and literature, was known as applicable as a means of reproducing and rendering audible this sound record. Gros states that the record may be on a flat disc or on a cylinder. The reproduction of sound described by Gros "the repetition with a mouth piece, or with a solid point entering into the indentation and causing a sonorous body to vibrate", is a clear description of the Edison reproducer for rendering audible the record formed as described. The Gros patent describes another means of producing a sound record and of directly reproducing it. The wire is softened by heat and the talking is done against a drum, having a point solidly connected therewith which imprints the more or less intense vibrations upon the wire. The repetition is immediately obtained by causing the wire to pass over the same road. The recording point is replaced by a metallic point which does not affect the steel.

ly duplicating sound records. The master record is first engraved in a lampblack coating having a metal backing. The metal is then apparently etched by an acid and used as a master record. A duplicate is made by causing a tracing point on one end of a lever to follow the pattern or master while the other end bearing a point engages the surface of a heated wire to form the required duplicate. This is a mechanical duplication substantially like that alleged to be practiced by the defendant.

British Letters Patent No. 1644 of 1878, to T.A. Edison, describes a mechanical duplicating process. I have heretofore referred to this patent which describes a complete phonograph apparatus, and various modifications and amplifications; the record tablet being either of metal foil or a foundation of paper coated with paraffine or some hydro-carbon, wax or gum, and the record is embossed on the one hand or cut or engraved, on the other, according to the material employed for the record surface. Figure 59 of the drawings illustrates a duplicating arrangement. I have caused this figure of the drawings to be reproduced on an enlarged scale and ask that it be inserted at this point for ready reference.

The drawing shows and the specification describes two parallel rotating cylinders and a hinged lever connecting a tracing point in contact with one cylinder and a recording point in contact with the other cylinder. a³, a⁴ are the two cylinders; g and g' are the two points referred to connected by the lever 40 pivoted at 41. This is a device for making duplicate sound records ~~adapted for making duplicate sound records~~ purely mechanical means and in all essential respects substantially like that employed by the defendant, as appears from the evidence.

The same British patent describes two other and slightly different arrangements of apparatus for duplicating sound records. I have caused the drawings of this modification to be reproduced, and ask that the drawings be inserted in the record at this point for ready reference.

Figure 60 shows a cylindrical master record obtained by the electrotype process in metal, and operating to indent strips or sheets of foil to produce copies. The strip is shown passing between the roller 42 bearing the copy of the record in relief, and an idle roller below it. In Figure 61 the roller 42 is of hardened metal the copy of the record appearing in relief. The surface of the duplicate 43 is pressed against the surface of the master record 42 and the duplicate is made from the copy. Figures 59, 60 and 61, are modifications of corresponding features of the complete phonograph apparatus shown in Figures 12, 13, 14, and 15, of the same patent.

Recess for lunch.

I understand these are all susceptible of practical use for the purpose of duplicating from original sound records.

The Telegraphic Journal, London, Feb. 1, 1879, Volume 7, page 53, describes the form of record surface attributed to Abbe Carhennel. It is described as a copper band thinly coated with wax to take the impression and etched or corroded afterwards by acid, so that a hard metal cast may be obtained. An alternative form consists of albumen spread upon paper or other base.. Edison's reproducing apparatus, I understand could be used to directly reproduce from these record surfaces.

The serial publication Cosmos, Volume 47, December 1878, pages 530, 531, contains an article in the French language describing the Abbe Carhennel phonograph.

The translation indicates that the structure is substantially like that described in the Telegraphic Journal.

Compte Rendus, Volume 86, page 22 11409 Paris, 1879, describes the phonograph of M. Delecheneau. The novel feature consists of the use of zinc and brass in the form of a cylinder, so that the record is obtained not by embossing, "but a real engraving of speech on an unyielding metal".

The Telegraphic Journal, London, November 16, 1879, describes the Gamard phonograph. It is stated that Edison's phonograph is defective because the time of recording sounds is proportioned to the size of the barrel; there is a necessity of wrapping the barrel with foil, and because of the flimsy character of the record many repetitions are not obtainable. In the Gamard phonograph the speech is impressed on a plane surface. The record material or tablet consists of a little copper rule, to which is attached a light leaf of copper or silver. Strictly speaking, the copper or silver leaf is the tablet. A series of these are caused to move in succession under the recording point, and an unlimited amount of sound music or vocal utterance can be recorded, as is the case with the successive application of the cylindrical records to phonograph instruments, at the present time.

I understand the article to be a clear description of an engraved sound record; the metal tablet being of metal in the form of a leaf or strip considerably thicker than metal foil, and possessing too great rigidity to permit of its conformation to the cylinder of an Edison

phonograph.

A small volume entitled "Le Microphone, le Radiophone et le Phonograph", edited by Du Moncel, Paris, 1882, contains substantially the same description as last above quoted. The record is referred to as "engraved deeply on the sheet of metal". It is stated that this preserves for a long time the lines which have been traced, and under these conditions the sounds emitted have much greater sonority.

Engineering, a serial publication printed in England, April 13, 1879, at page 327, describes a form of apparatus for recording sound and reproducing it in an audible manner, including a commercial form which can be sold at a small price for popular use, or as a toy. The record is in the form of a series of parallel lines. There is the usual diaphragm with a thin flat plate having its lower end cut out to form a concave cutting edge. The record tablet consists of glass thickly coated with ~~stearine~~ wax scraped into a convex form; The convexity of the record surface corresponding to the concavity of the recording point. The described tablet is moved in a straight line, and the recording point marks its surface with the sound record. Duplicates are made of this record in the form of leaden wires, which are sold for sixpence, as the article states. Of course, this stearine wax sound record could be used to reproduce directly and audibly the sounds which have made the record, but such a record does not stand reproduction many times. as has been demonstrated With respect to the wax and

paraffine coated paper record; Lambrigt therefore provided for duplicating the record in a harder and more enduring material. The article credits Edison with the prior production of a sound record on a stearine surface.

The Journal of the Society of Telegraph Engineers, London, 1879, Volume 8, page 303, contains a description of an exhibition of the Lambrigt phonograph at a meeting of that Society.

French Letters Patent No. 135,633, dated March 20, 1880, were issued to Charles Weyher, for improvements in a continuous phonograph. The record tablet was a wire of copper, brass, iron, steel, or any other metal, alloy, or suitable material. This wound on a bobbin from which it is unwound and reeled upon a second bobbin substantially as shown with the paper coated strip in the Bell and Tainter patent No. 341,214. The vibrating stylus attached to the diaphragm is described as a small burin, the cutting part of which is perpendicular to the wire. I understand the patent to contain a full and clear description, sufficient to enable anyone skilled in the art to make and use a phonograph in which a burin attached to a diaphragm operates to engrave, cut, or gouge the record in a solid record material. A burin is an engraver's tool, universally used for engraving. It is described and illustrated in Webster's Dictionary as a noun, corresponding to the French word burin, the Italian burino, and defined as "the cutting tool of an engraver on metal, used in line engraving. It is made of tempered steel, one end being ground off obliquely so

as to produce a sharp point, and the other end inserted in a handle; a graver; also, the similarly shaped tool used by workers in marble. Second, the manner or style of execution of an engraver; as a soft burin; a brilliant burin." The illustration accompanying the description or definition in Webster's Dictionary, I have caused to be reproduced and ask that it be inserted at this point in the record,. I have also placed in proximity for comparison, Figures 5 and 6 appearing in the specification of the patent No. 341,214, which is referred to in the patent in suit, page 1, column 1, line 20. In proximity to these figures I have shown the section of the burin reduced to the same proportions and placed them in comparison. They are practically identical.

United States Letters Patent No. 237,166,¹ dated to Reynolds
October 23, 1883, for Improvements in Phonographs, describes and illustrates the employment of a rotating cutter against which the solid record tablet is to be moved by the vibrating diaphragm. That is to say, there is a rotary cutter which maintains its position, and there is the usual vibrating diaphragm with a point projecting against a longitudinally moving strip or record tablet, the vibration of the diaphragm by sound waves operates to bring the record tablet and cutting style into contact to a greater or lesser extent depending upon the amplitude of sound vibrations. In Figure 3 there is illustrated a duplicating apparatus, clearly described in the specification, in which a tracing style is located upon one end of a pivoted lever, and a suitable recording

device is at the opposite end. The end of the lever opposite the tracing point, carries the contact point, operating to bring the cutting style and record surface into engagement in harmony with sound vibrations.

I have caused this Figure 3 of the drawing illustrating the duplicating apparatus to be reproduced, and I ask that it be inserted at this point for reference.

there is

It is to be noticed that, an original sound record shown and described, and a blank to receive the duplicate, a tracing style or reproducer, following the sound record of the original, mechanically connected through the medium of a pivoted bar or lever with the blank upon which the duplicate is to appear, in such a manner that the indentations of the original are cut to represent an exact duplicate in the surface of the second blank.

United States patent No. 201,760, to T.A. Edison dated March 26, 1878, for Improvement in Phonographs, shows and describes a means which may be applied for duplicating sound records. The medium connecting the master record with the duplicate is a column of air under pressure. I have caused Figure 3 of the drawings of this patent to be reproduced, and ask that it be inserted in the record at this point.

only a lathe. The process of duplication is a mechanical process, as practiced by the defendant; a duplicate sound record is the result of the operation of two small lathes, one carries the pattern, the other carries the object to be formed in exact reproduction of the pattern. The pattern and the blank are rotated in synchronism or nearly so; there is a lever connecting the two surfaces; a tracer on one end follows the outline of the pattern; a cutting tool on the other end cuts and forms the surface of the blank as determined by the pattern. This is a common device in the mechanic arts.

United States Letters Patent No. 12,102, to Casselman, for an improved machine for turning irregular forms, is dated January 9, 1895. The specification states:

"My invention relates to that description of machinery which produces irregular surfaces by a true circular motion of the work, and a movement of the tool produced by a pattern in a direction parallel with the axis on which the work revolves."

"The drawing shows and the specification describes a vertical shaft carrying a horizontal disc. The ornamented surface of this disc is the master or pattern. On each side of this master, and rotating in unison with it, is a blank disc from which a duplicate is to be made. A compound lever is pivoted above the rotating discs. A point or tracer projecting from this compound lever and carried by it, follows the outline of the pattern. A cutting tool, fixed to the same compound lever, is provided for each blank disc. The cutting tools are controlled by the tracer, through the medium of a pivoted lever. The specification states:

"The cutting tools a b may be of any description commonly used in turning the material to be operated upon, but I prefer to use rotary cutters, such as are commonly used in machine carving. "

Means are provided for rotating the pattern and the blanks in unison, and for moving the carriage carrying the tracer and cutting tools gradually on radial lines so as to engage every point of the surface in succession. The apparatus shown and described embodies a combination of elements corresponding exactly, element for element, with the machine shown and described in the patent in suit, with this exception, however, that in the Casselman patent the ~~xxxxxxxxxxxxxxxx~~ tracer and cutter are located on a compound lever which rises and falls instead of being located respectively at opposite ends of a bar which is liable to be jammed between rotating surfaces slightly out of parallel.

~~xxxxxxxxxxxxxxxxxxxxxxxx~~

Adjourned to Friday, May 19, 1909, 10. A.M.

New York, May 19th, 1899, 10. A.M.

Met pursuant to adjournment.

Present, counsel as before.

DIRECT EXAMINATION OF MR. VANSIZE CONTINUED.

(Witness continues his answer to Q.5.)

This duplicating mechanism of the Casselman patent however, more nearly resembles defendant's alleged infringing apparatus in the employment of pivoted levers permitting the tracer and cutting tool to rest by gravity on the work. If we substitute hollow cylinders for the discs in the Casselman patent, and cause the tracer to engage the surface of the master cylinder and the cutting tool to engage the surface of the blank to be produced as a facsimile of the master, we shall have practical identity with defendant's device as represented in the evidence of infringement.

United States Letters Patent No. 23,957, dated May 10, 1889, to C. & A. Spring, for improvements in Turning Lathes, shows and describes a master controlling a cutting tool to operate upon the cylindrical surface of the blank form to be turned and fashioned like the master or pattern.

The subject-matter of this patent has been the subject of judicial investigation, and the result is reported in 21 Federal Reporter, 630.

United States Letters Patent No. 33,823, dated June 9, 1863, to Hiram W. Hayden, shows and describes an engraving machine for duplicating engraved cylindrical surfaces. The specification states:

"
Various articles - such as silverware and pencil cases-have been ornamented by means of a die or a roller with the design engraved thereon and pressed upon the surface to be ornamented, and a chaser or engraving tool has been employed to ornament pencil cases, &c., by longitudinal lines, straight or wavy, intermitted or continuous.

"The nature of my said invention consists in a method of ornamenting lamp stands and similar articles by a series of parallel lines engraved upon the surface of such articles by a standing tool, against which said article is caused to rotate, and which tool is raised from the surface at certain points, so as to leave the said surface plain at such points, to produce the figure or pattern of the ornamentation.."

I have caused the drawing of this patent to be reproduced and I ask that it be inserted at this point for ready reference. The descriptive portion of the specification reads as follows:

"a is a mandrel, sustained in the heads bb, and driven by competent power applied to the pulley c. At one end of this mandrel a, the lamp stand d or other article is attached in any convenient way by setting upon a corresponding shape or otherwise. At the other end of this mandrel is a pattern, e, corresponding in size and shape to the exterior of the article to be engraved. Upon this pattern e is marked out the design to be engraved, and the parts that are to be ornamented on the lamp stand by the engraved line are cut out, removed, or countersunk.

"f is a slide rest, that is caused to progress longitudinally and parallel to a by a screw thread on a, taking the end of the lever g and this slide rest f is fitted with a rock shaft, h, on centers ii, and said shaft h carries standards k and l, and m is a spring to keep l towards d. In or supported by the standard l is an engraving tool, n, and o is a tracer in k. These parts of the instrument are adjusted so that the distance between n and o is the same as between d and e, and when the tracer o rests on the surface of e, the tool n is clear of the surface of d; but so soon as the tracer enters a depression in the pattern the said tool begins to cut by being drawn to d by the spring m. By this means the lamp stand or similar article is ornamented by a series of spiral or nearly horizontal lines by the said tool acting when the tracer o is in the cavity or depression in e, and being relieved when the tracer rests upon the surface of e, so that the interruption of the engraved line produces the pattern, and the screw n causes the movement of the slide f, in order that the entire surface to be ornamented may be traveled over."

The above described and illustrated lathe mechanism is substantially identical with the alleged infringing device of the defendants, although defendants are represented to employ two mandrels geared together, and the patent of Hayden shows and describes one mandrel with the pattern on one end and the blank to be formed upon the other.

United States Letters Patent No. 134,493, dated December 31, 1872, to William Von Hofe, shows and describes an adaptation of lathe machinery to engraving on glass cylinders. There is the pattern and the blank to be

formed, rotated together upon the mandrel or arbor of a lathe. A tracing point on the end of a compound lever follows the pattern while the engraving tool in a sliding rest pivoted to the other end of the lever is controlled by the tracer and cuts or engraves the blank in facsimile of the pattern.

United States Letters Patent No. 213,554, dated March 25, 1878, application filed March 25, 1877, to T.A. Edison, for Improvements in Automatic Telegraphs, shows and describes a rotating disc with a tracing point following a pattern on this disc which is suitably rotated. At the distant station is a similar disc synchronously rotated, bearing a suitable blank sheet; and a recording point engages its surface. The tracer at one station following the pattern is connected with the recording point at the second station through the medium of electromagnetism and an electric circuit. The result of the operation is the production of a duplicate of the pattern sheet. This is shown in Figure 6 of the drawings of the patent, as a square sheet of paper, having the record in the form of a volute spiral.

United States Letters Patent No. 230,540, dated July 27, 1880, to Fogelberg and Graves, describes apparatus for producing note cylinders for musical instruments. The analogy between the music box and the phonograph is very close.

This patent shows and describes a master or pattern and a blank to be formed or duplicated in facsimile.

In Figures 1, 2 and 3, the master is in the form of a plane surface with projections and depressions. In Figure 4 a modification is shown, the master or pattern being a cylinder with the points or projections in its periphery.

The specification states:

"Our invention relates to a new and useful apparatus for marking note cylinders for musical instruments. Such note cylinders are generally provided with projecting metallic pegs and staples driven into the wood of the cylinders and located on the peripheries thereof at proper intervals, so as to produce the desired tunes on the musical instruments in connection with which they are used."

Referring to the drawings, the specification continues

"g represents the note cylinder or blank that is to be marked or indented, and its shaft g' is for this purpose made to rest loosely in bearings on the adjustable bars hh hinged to the frame d at h'h as shown."

Referring to the modification shown in Figure 4 it is stated:

"In Fig. 4 the rotary template-cylinder l with its note-projections r g' r" is shown as being substituted for the sliding template note-board a in Fig. 1.

"t t represent staples or projections on the template a, which, when the latter is moved horizontally, cause the tooth r to rise and fall, and by the connecting mechanism, as above described, the pencil or marker n is also made to rise and fall, so as to produce corresponding note-marks, on the cylinder g, when the latter is rotated either by means of a crank or other suitable mechanism.

"To mark a cylinder it is therefore only necessary to bring it in contact with the projections on the template-board a or template cylinder l, as described, and by moving them together with equal surface velocity it is easily perceived that the projections on the aforesaid template or templates produce corresponding marks g' on the note cylinder g, that serve as guides where to drive and locate the pegs or staples that act as note-projections. . . .

"This our apparatus may be used equally well for making indenture or for printing marks on the note cylinder. In the latter case it would only be needed to have all the projections on the template of a flattened upper surface and to color them with

suitable ink or color.

"After a cylinder has been marked or indented, as above described, it is removed and the pegs and staples driven by hand, as usual. The operation may be repeated to mark or indent any number of cylinders required."

The last described patent shows the application of the mechanical principle of a duplicating lathe to the preparation of cylinders for musical instruments. The cylinder for a musical instrument is a mechanical device in every way analogous to the duplicate sound record, and in the same class and sub-class logically considered.

United States Letters Patent, No. 277,349, to J. H. Rogers, dated May 8, 1883, for Improvement in Automatic Telegraph, shows and describes a rotating cylinder at a transmitting station, and a rotating cylinder at a receiving station. A tracing point moves in contact with a cylindrical surface at the transmitting station and a re-
point
point cording moves in contact with the cylindrical surface at the receiving station. The recording point is connected with the tracing point through the medium of an electric circuit and electromagnetism. A duplicate of the pattern at the transmitting station is produced on the blank at the receiving station.

The patents and publications in the art of lathe machinery, and especially the class devoted to turning irregular forms, the first of which was the Blanchard spoke and gun stock lathe, also adapted to the use of duplicating shoe lasts, are very numerous. I find that rotary cutters and stationary cutters or cutting tools influenced by the tracing point following the outlines

of the pattern have been extensively used, and that as regards the form and arrangement of cutting tools, the rotary ^{and} ~~or~~ the fixed cutter are well known equivalents within the skill and knowledge of a mechanic who would naturally adapt either form of cutter to the peculiar work in hand. This is generally dependent upon the quality of the material to be cut which may be fibrous and grained, or be practically without structure and susceptible of smooth cutting through the agency of a fixed cutter.

Q.6. Please compare the subject-matter of claims 4, 14, 15 and 16 of patent 341,287, being the patent in suit, with what you find described in patents and publications earlier in date than August 29th, 1885, and state whether or not in any such patents or publications you find substantially the combination of subject matter of such claims or either of them, and give briefly your reasons for any opinion you may express?

A. Claims 4 and 16 appear in the form of method claims. They state the necessary operation or function of the machinery summarized in claims 14 and 15. Claim 4 reads as follows:

"4. The method of copying sound records by causing the record that is to be copied to impress movements corresponding to recorded sound waves upon a cutting tool, and thereby engraving or cutting out a similar record in the surface of a suitable tablet, substantially as described."

Claim 16 is in the following language:

"16. The method of preparing sound records, consisting in first cutting the record in a soft material - such as wax - by the action of sound waves upon a vibratory cutting style, and then causing said wax record or a copy of the same to impress corresponding vibrational movements upon a graver or cutting tool in contact with a record tablet, substantially as described."

It is to be noted that the patent in suit states that

"The wax record would not ordinarily have sufficient strength to withstand the pressure to which it would be subjected in cutting the metal, and for this reason the electrotpe is made."

So that while claim 16 speaks of causing said wax record to impress corresponding vibrational movements upon a graver or cutting tool in contact with a record tablet, the specification states that this is not possible and no mechanism is shown by which it could be done. In fact it would be utterly impossible to do it with the apparatus shown and described in the patent. What the patent really describes and claims is the making of a duplicate mechanically from a duplicate produced electro-chemically. In considering the anticipating matter, it will tend to abbreviate the record to consider the claims together. I will quote the 14th and 15th claims:

"14. The combination, with a tablet having a record formed there-in and a tablet for receiving a record, of a follower having a fine though blunt edge for rubbing over the record, a non-rotating cutter movable with said follower for engraving the record in the second tablet, and mechanism for revolving said tablets and causing the follower to follow the record, and the cutter to trace a spiral line upon the second tablet, substantially as described.

"15. The combination, with the two tablets and the operating mechanism, of the follower having a fine though blunt edge for rubbing over the record, the spring for holding it against the record, the non-rotary cutter, and the adjustable connection between the follower and the cutter to enable the depth of cut to be regulated, substantially as described."

British Letters Patent No. 1644 of 1878 to Edison, shows and describes a complete phonograph apparatus in which the indentations representing the sound-record or sound vibrations, are either embossed in tinfoil or

cut or engraved in wax, paraffine or some suitable hydrocarbon employed as a coating on a paper backing to form the record tablet.. Every essential part of the phonograph employed by the defendant is shown and described in this British patent, and in Figure 59 of the drawings, a mechanical duplicating apparatus is shown. This is described in the specification on page 10 at line 43, as follows: There are two parallel cylinders geared ~~together~~ together and a pivoted bar or lever carries a tracing point and a recording point. The tracing point follows the sound record in the master cylinder and the recording point cuts a corresponding groove in the surface of the duplicate. The function or operation of this apparatus corresponds accurately with the function or operation of ^{the} machine summarized in the fourth claim of the patent in suit and ^{also} in the 16th claim of said patent. We have also the elements of the 14th claim clearly shown and described. There is a tablet, having a record formed therein, that is the cylinder on one mandrel a3. We have a tablet for receiving the record on the cylinder a4. A follower having a fine though blunt edge for rubbing over the record; that is the point c in engagement with the cylinder a3. There is a non-rotating cutter c' on the cylinder a4 for engraving the record in the second tablet, and there is mechanism for revolving said tablet and causing the follower to follow the record and the cutter to trace a spiral line, shown in Figures 12 to 15 of the Edison patent, to which the apparatus of Figure 59 is connected.

Referring to claim 15, and comparing it with the structure shown and described with respect to figure 59, I find in both cases there are two tablets in Figure 59 having the form of cylinders a3 a4. These are connected with the operating mechanism in the form of a lathe run by a spring motor, Figures 12 to 16 of the Edison patent. The follower, with a fine though blunt edge for rubbing over the record, is the point c on the cylinder a3. The spring for holding it against the record is present in the form of a mechanical equivalent, consisting of the gravity of the lever, hinged at 41. There is a non-rotary engaging cutter c HN, the cylinder a4, and the adjustable connection between the follower and the cutter to enable the depth of the cut to be regulated, is the length of the lever between the points c and c' of the two cylinders respectively. By varying this distance the extent of movement of the recording point can be varied, and with it the depth of cut. In my opinion, for the reasons stated, this Edison patent No. 1644, shows and describes the subject matter summarized in the stated claim and in each of them.

French Letters Patent No. 124,213, July 27, 1878, to Charles Gros, ~~xxxxxxxx~~ describes substantially the same mechanical duplicating apparatus as that described in the patent in suit. Gros made an original record too fragile for use in duplicating. He, however, made an electro-chemical copy of this and he duplicated the electro-chemical copy in an iron record. I quote from the specification:

record tablet is to be vibrated. Figure 8 of the drawings shows the duplicating apparatus. The tracing style follows the record in the master or original, and the opposite end of the lever carries a contact point, operating to force the cutting style into the surface of the record tablet intended to form the duplicate. I have caused the figure of the drawing representing this duplicating apparatus (Figure 8) to be reproduced, and I ask that it be inserted at this point for reference.

I quote the portion of the specification describing the duplicating apparatus:

"The essential principle of my improvement may be utilized for reproducing, in durable and amplified form, the fragile records made by the old styles of phonographs. In the diagram, Fig. 8, is illustrated the embodiment of my improvement in an apparatus for this purpose. The letter A2 designates a cylinder which may be arranged to travel longitudinally, as well as to rotate in a manner similar to that of the cylinder of the old styles of phonograph. B3 is a lever provided with a stylus, b2, for acting upon an old record sheet, which may be placed upon this cylinder. Said lever has an adjustable fulcrum, f, and at the end opposite the stylus, carries a pressure roller B4. The letter G3 indicates a supporting table, against which the roller B4 will be pressed by a spring g1. This table has an opening at g3 through which plays the edge of the cutter wheel I4, which may be given a rotary motion by any suitable means. The letter H4 indicates a record strip, which may be drawn under the wheel B4 and across the edge of the cutter wheel, and if, while the said strip is so drawn, the cylinder A2 be rotated, the record strip thereon will vibrate the lever B3 and cause the roller B4 to press the record strip in contact with the edge of the cutter wheel with a varying pressure corresponding to the indentations of the record sheet, which will be thus copied and given the form of a continuous strip. It is obvious that the copy may be much amplified by regulating the position of the adjustable fulcrum, so that the wheel B4 will be carried by a long arm having any desired proportion to a shorter arm of the lever B3, which carries the stylus."

It is to be noticed that here is shown and described an original sound record of the cylinder form, a blank to receive the duplicate of the sound record, a tracing style or reproducer, following the groove of the sound record in the original, and this is mechanically connected by an adjustable pivoted bar with the blank upon which the duplicate is to appear in such a manner that the indentations of the original are cut to represent a substantial duplicate in the surface of the blank tablet.

Referring to the structure summarized in claim 14, we have in this Reynolds patent a tablet having a record formed therein, A2, a tablet for receiving a record, H4, a follower having a fine though blunt edge for rubbing over the record b3, a non-rotating cutter movable with said follower for engraving the record on the second tablet, B4 and I⁴, and mechanism for revolving said tablets and causing the follower to follow the record and the cutter to trace a line upon the second tablet, which line is spiral, if the record tablet is so arranged. I am conscious of the fact that I⁴ is a rotating cutter, while the claim specifies a non-rotating cutter, but in the literature and art of phonographs, and in the mechanic art, the rotating cutter and the stationary cutter are known and recognized as mechanical equivalents, and this was so prior to the date of the patent in suit. / ~~Rxyzxyz~~

In my opinion, for the reasons stated, the Reynolds patent is a complete description and illustration of the subject matter summarized in claim 14.

Referring to claim 15, and comparing it with the Reynolds patent, we have two tablets, A2 H4, with suitable operating mechanism; a follower having a fine though blunt edge for running over the record, b3; the spring for holding it against the record, g4; the non-rotary cutter, B4; and the adjustable connection between the follower and the cutter to enable the depth of cut to be regulated. This is the fulcrum f', and the pivot points, ^{or holes} arranged in a row in the lever B3. I am conscious of the fact that the cutter I⁴ is designed to be rotated, but

rotary cutters and stationary cutters were known prior to the date of filing the application for the patent in suit to be substantial mechanical equivalents, and it was within the ordinary skill of a mechanic to select one form of cutter or the other as circumstances might determine.

Regarding claims 4 and 26, both these claims concisely and accurately state the function or mode of operation, -the necessary and inevitable mode of operation, of the duplicating apparatus of the Reynolds patent, and in my opinion, for the reasons stated, the Reynolds patent is a complete embodiment of the subject matter summarized in each and all of the claims referred to in the question.

United States Letters Patent No. 12,192, to Casselman, dated January 9, 1955, describes a form of duplicating machine which is practically identical with the apparatus employed by the defendants. There is the tablet having at a record formed therein, D'; a tablet for receiving a record at D; a follower having a fine though blunt edge for rubbing over the record a; a non-rotating cutter movable with said follower, ~~xxxxxx~~ e, for engraving the record in the second tablet; the two points are movable together because both are supported by the compound lever J, K, and there is mechanism for revolving the tablet and causing the follower to follow the record and the cutter to trace a spiral line on the second tablet. In my opinion, for the reasons stated, the Casselman patent is a complete embodiment of the subject matter summarized in claim 14.

Referring to claim 15, and comparing it with the Casselman patent, in both cases we have two tablets, at D and D'; operating mechanism consisting of the rotating shafts geared together and the tool holder moved along by a feed screw movement; there is a follower having a fine though blunt edge for rubbing over the record, g; the spring for holding it against the record; this is present in the form of the gravity lever, the follower rests by gravity upon the pattern or master; we have the non-rotary cutter e. The specification states, column 1, line 3, "the cutting tool a may be of any description commonly used in turning the material to be operated upon". There is the adjustable connection between the follower and the cutter, to enable the depth of cut to be regulated. This consists of the adjustable ~~xxxxx~~ suspension of the compound lever J, K. In my opinion, for the reasons stated the Casselman patent is a complete embodiment of the subject matter of claim 15.

In expressing the opinions here expressed, I am aware that the patent in suit shows and describes a disc form of sound record, and the Casselman patent shows a disc form of pattern and duplicate, ~~as shown~~, probably intended for ornamental architectural purposes. But the substitution of the sound record disc for the described disc of the patent is an obvious substitution, and the capacity of the machine for working on one material as well as another, is immediately evident to anyone. The purpose to which the pattern and duplicate are subsequently put is immaterial.

the necessary and inevitable operation of the machine described in the Casselman patent, and in my opinion, for the reasons stated, the Casselman patent is a substantial embodiment of the subject-matter described in the four claims named in the question, and of each of them.

United States patent No. 33,823, dated June 9, 1863, issued to H. W. Hayden, shows and describes a duplicating lathe. Referring to figures 1 and 2 and 3 of the patent, and to the structure summarized in claim 14 of the patent in suit, I find in both cases there is a tablet having a record formed therein, g; this is the master or pattern; a tablet for receiving a record, d, or the duplicate; a follower having a fine though blunt edge for rubbing over the record, g; a non-rotating cutter movable with said follower for engraving the record in the second tablet, n; and mechanism for revolving said tablet and causing the follower to follow the record and the cutter to trace a spiral line upon the second tablet; this consists of the pulley c on the mandrel a, to which motive power is applied; the carriage f, the feed screw p, the lever and half nut g by which the carriage and feed screw are geared together. In my opinion, for the reasons stated, the Hayden patent is a complete embodiment of the subject matter of claim 14.

Comparing claim 15 with the Hayden patent, I find that in both cases, we have two tablets e and d; the operating mechanism consisting of the essential features of a lathe; the power rotated mandrel; the feed screw; the tool-carrying carriage, geared to the feed screw; we have the follower having a fine though blunt edge for rubbing

For the record,
A o: the spring for holding it against the r
3; the non-rotary cutter, n, and the adjustab-
tion between the follower and the cutter to enable
depth of cut to be regulated; this consists of the
holder with its set screw for connecting the tools o a.
n with the pivoted bar h carried by the movable carriage
f. In my opinion, for the reasons stated, the Hayden
patent is a complete embodiment and description of the
structure summarized in the 15th claim.

Regarding claims 4 and 16, these claims concisely
state the inevitable mode of operation or function of the
machine shown and described in the Hayden patent. In
my opinion, for the reasons stated, the Hayden patent
clearly shows and describes the same subject-matter set
forth in the four claims named in the question, and in each
of them.

United States Letters Patent No. 134,493, dated
December 31, 1872, to Vom Hofe, shows and describes an
engraving machine, including a pattern or master, F; a
blank to be duplicated, G; the tracing point, c; the
cutting tool K; the compound lever connecting the two
tools, and the machinery for revolving the tablet and
causing the follower and cutter to operate, substantially
as described in the patent in suit. The machine also
possesses the features of adjustability described in the
patent in suit; the tracer rests by gravity upon the
pattern, and there is an adjustable connection between
the follower and the cutter, consisting of the clamp I,
by means of which the adjustment of the knife or cutter
K is effected.

The necessary and inevitable operation of this machine is the same as that described in the patent in suit, and in my opinion, for the reasons stated, this Von Hofe patent is a complete embodiment of the subject-matter summarized in the four claims named in the question, and each of them.

United States Letters Patent No. 230,540, dated July 27, 1900, to Fogelberg and Graves, shows and describes apparatus for duplicating cylinders for musical instruments. There is the cylindrical tablet having a record formed thereon, l; a tablet for receiving the record, g; a follower having a fine though blunt edge for rubbing over the record, r, Figure 3; a non-rotating cutter movable with said follower for engraving the record in the second tablet, n; a mechanism for revolving said tablet and causing the follower to follow the record and the cutter to trace a spiral line upon the second tablet; this consists of the crank e', all ~~xxxxxxxx~~ substantially as summarized in claim 14.

Regarding claim 15, and comparing it with the Fogelberg and Graves patent, in both cases we have two tablets, l and g, and the operating mechanism for rotating them together; the follower r; the spring for holding it against the record g; the non rotary cutter n; and the adjustable connection between the follower and cutter consisting of the compound lever o, p, q, pivoted as shown and described.

Claims 4 and 16 of the patent in suit, describe the necessary and inevitable mode of operation or function.

of the machines described in both patents, and the patent of Fogelberg and Graves in my opinion is a complete embodiment of the subject-matter summarized in the claims named in the question, and each of them.

United States Letters Patent No. 215,544, dated March 25, 1879, to T.A. Edison, for Improvements in Automatic Telegraphs, and United States Letters Patent No. 277,349, dated May 3, 1883, to J.H. Rogers, for Improvements in Automatic Telegraphs, show and describe a master disc record in one case, and a cylinder record in the other. At a distant point there is a blank or tablet to receive a duplicate impression from the master tablet. In each case a tracing point follows the line recorded in the master blank, and a recording device traces the same record in the duplicate blank at the distant station. The medium connecting the tracing point at one station and the recording point at the other, is an electric circuit, employing an electro-magnet to cause the movements of the tracer to be reproduced at the recorder. In the case of both patents there is means for revolving the tablets and causing the follower and the recorder to trace their respective spiral lines, and in the respects named, each of these patents shows and describes equivalent means for performing each separate function attributed to corresponding elements in the patent in suit. I am conscious that the recording apparatus forming the duplicate operates to emboss or to ink mark instead of to cut the surface; but in the state of the art of phonograph apparatus at the date named in the question, all these

means of recording were known as substantial equivalents under appropriate conditions, and I am of the opinion that the Edison patent named is ~~xxxx~~ a substantial embodiment of the subject matter of each of the claims named in the question, and I am of the opinion that the Rogers patent is a substantial embodiment of each of the claims named in the question, for the same reasons.

I therefore find that substantially the same combination of subject matter is shown and described in each of the patents referred to by me, and in each of the claims appearing in the patent in suit and named in the question, for the reasons stated.

Adjourned to Tuesday, May 30th, 1899, 11 A.M.

New York, May 30th, 1899, 11 A.M.

Met pursuant to adjournment, and adjourned to
Wednesday, May 31, 1899, 11 A.M.

New York, Wednesday, May 31, 1899, 11 A.M.

Met pursuant to adjournment.

Present counsel as before.

DIRECT EXAMINATION OF MR. VANSIZE CONTINUED.

(Witness continues his answer to Q.6.)

United States Letters Patent No. 219,939, dated
September 27, 1879, to A. W. Hall, shows and describes
an improvement in Phonographs.

The improvement described and illustrated consists
in providing a phonograph instrument with two parallel
mandrels, gearing them together so that they rotate in
synchronism, and arranging a pair of record surfaces on
parallel cylinders with a pair of recording tools between
the cylinders carried upon a pivoted lever which lever
is connected at one end to a vibrating diaphragm. There
is means for adjusting ^{the} depth to which the points engage
^{also} the surface of the record, ^{also} for causing the points to follow
the groove in the cylinders, and the diaphragm operates
as a spring to hold the recording points in contact with
the cylinders. The specification states:- referring to
the lever and its recording points:

"The lower part of the said lever is furnished
with two points, g g', which are so situated be-
tween or relatively to the two cylinders F F' that
one is capable of touching the tinfoil or other
yielding material on one cylinder, while the other
is capable of touching that on the other cylinder."

"The said points are attached to a lever by means of elastic carriers h h', or otherwise, in such manner as to be capable of adjustment to the requisite distance apart by means of a cam or eccentric a (see Fig. 3), or other equivalent device attached to the lever for the purpose.

"The fulcrum b of the lever is made adjustable in the standard B by being secured in a sliding block, c, which can be moved upon the standard in one direction or the other by means of adjusting screws d d' for the purpose of setting the lever, so that when the diaphragm and lever are at rest, and the points g g', are at the proper distance apart, the said points may both just touch or press equally upon the yielding material upon the two cylinders.

"The operation of the instrument in recording is as follows: The tinfoil or other yielding material upon which the record is to be obtained, having been secured upon the cylinders, and the standard having been brought down and secured upon the post J to bring the points g g' between the two cylinders, and the cylinders having been so adjusted lengthwise, or the points so adjusted lengthwise, of the cylinders that one of the points is opposite to a groove in one cylinder and the other opposite to a groove in the other cylinder, the points are then adjusted so that each presses very slightly upon the foil or other material on one of the cylinders, and the shafts E E' and cylinders F F' are then set in motion by the clockwork or other motor provided for the purpose".

Comparing this structure with the structure summarized in claims 14 and 15, we find that in the Hall patent, and in claim 14 of the patent in suit there are two tablets, a follower having a fine though blunt edge, a non-rotating cutter movable with said follower, mechanism for revolving said tablet causing the follower to follow the record, and the cutter to trace a spiral line upon the second tablet.

In claim 15, and the Hall patent, there are two tablets and suitable operating mechanism, a follower having a fine though blunt edge for rubbing over the record, a spring for holding it against the record; in

the Hall patent this consists of the pivoted lever connected with the flexible diaphragm. In both cases there is a non-rotary cutter and an adjustable connection between the follower and the cutter to enable the depth of cut to be regulated. In the Hall patent this is the flat spring supporting the two points described, and the can-shaped adjusting piece by which the distance between the two points is regulated and adjusted.

In my opinion, for the reasons stated, the Hall patent shows and describes substantially the same apparatus summarized in claim 14, and also in claim 15. I am aware in expressing this opinion that the two-cylinder machine described in the Hall patent is not described as a duplicating machine, but the substitution of a master record on one cylinder and a blank on the other cylinder, would inevitably result in a duplication according to the method summarized in claims 4 and 16 of the patent in suit, and the function of the machine of the Hall patent is the production of two substantially similar records, one being the counterpart of the other, in exactly the same sense that the master and duplicate alleged to be produced by the defendants correspond. In my opinion, for the reasons stated, the Hall patent is a substantial anticipation of all the claims inquired about in the question.

Q.7. Please look at the model of a duplicating apparatus I now show you, and state what it is?

A. The model referred to was made under my instructions by following the description of British Letters

patent No. 1644 of 1878, to T. A. Edison, for Improvements in Recording and Reproducing Sound, and embodies the apparatus particularly shown and described in Figures 14, 15 and 59. There are the two parallel cylinders geared together by a belt, and there is suitable means for driving the cylinders by spring motor power, as shown in Figures 14 and 15. On one cylinder there is a master record, and on the other cylinder there is a duplicate thereof. The recording point and the tracing point are on a lever resting by gravity on the surface of the two cylinders respectively, as shown in Fig. 59. The tracing and recording points are moved along by a screw feed arrangement while the cylinders rotate, this detail being substantially identical with that of Fig. 15 of said patent. The record on the cylinder more remote from the fulcrum of the lever is a duplicate of the master record appearing on the cylinder adjacent to the fulcrum.

Counsel for defendant offers in evidence the model referred to in the answer to the last question, together with the two records on it, and it is marked, "Defendant's Exhibit, Vansize Model of Duplicating Apparatus, Edison's British Ex., Patent of 1878, S.D.O., May 31, 1899".

Defendant's Counsel offers in evidence printed copies of the following, marked U.S. Letters Patents:

U. S. Patent to Casselman, No. 12,193, dated January 9, 1855 and the same is marked "Defendant's Exhibit Casselman Patent 12,193, S.D.O., Ex., May 31, 1899".

U. S. Patent to C. & A. Spring, No. 23,957, dated May 10, 1859 and the same is marked "Defendant's Exhibit, Spring Patent, 23,957, S.D.O., Ex., May 31, 1899".

U. S. Patent to Hiram W. Hayden, No. 36,623, dated June 9, 1863, and the same is marked "Defendant's Exhibit, Hayden Patent, 36,623, S.D.O., Ex., May 31, 1899".

U. S. Patent to William Von Holtz, No. 134,493, dated December 31, 1872, and the same is marked "Defendant's Exhibit, Von Holtz Patent, 134,493, S.D.O., Ex., May 31, 1899".

U. S. Patent to T. A. Edison, No. 200,521, dated Feb. 12, 1878, and the same is marked "Defendant's Exhibit, Edison Patent, 200,521, S.D.O., Ex., May 31, 1899".

U. S. Patent to Thomas A. Edison, No. 201,760, dated March 26, 1878, and the same is marked "Defendant's Exhibit, Edison Patent, 201,760, S.D.O., Ex., May 31, 1899".

U. S. Patent to T. A. Edison, No.
213,554, dated March 25, 1879, and the same
is marked "Defendant's Exhibit, Edison Pa-
tent, 213,554, S.D.O., Ex., May 31, 1899".

U. S. Patent to W. A. Hall, No.
219,939, dated Sept. 23, 1879, and the same
is marked "Defendant's Exhibit, Hall Pa-
tent, 219,939, S.D.O., Ex., May 31, 1899".

U. S. Patent to Thomas A. Edison, No.
227,679, dated May 18, 1880, and the same
is marked "Defendant's Exhibit Edison Pa-
tent 227,679, S.D.O., Ex., May 31, 1899".

U. S. Patent to Fogelberg & Graves, No.
230,540, dated July 27, 1880, and the same
is marked "Defendant's Exhibit, Fogelberg &
Graves Patent 230,540, S.D.O., Ex., May
31, 1899".

U. S. Patent to J. H. Rogers, No.
277,349, dated May 8, 1883, and the same
is marked "Defendant's Exhibit, Rogers
Patent, 277,349, S.D.O., Ex., May 31, 1899".

U. S. Patent to C. C. Reynolds, No.
287,166 dated October 23, 1883, and the same
is marked "Defendant's Exhibit, Reynolds
Patent, 287,166, S.D.O., Ex., May 31, 1899".

U. S. Patent to Sumner Tainter, No.
341,287, dated May 4th, 1836, and the same
is marked "Defendant's Exhibit, Tainter Pa-
tent, 341,287, S.D.O., Ex., May 31, 1899".

U. S. Patent to T. A. Edison,
No. 332,418, dated May 8, 1888 and the same
is marked "Defendant's Exhibit Edison Pa-
tent 332,418, S.D.O., Ex., May 31, 1899".

U.S. Patent to T. A. Edison, No.
332,462, dated May 8, 1888, and the same is
marked "Defendant's Exhibit, Edison Patent
332,462, S.D.O., Ex., May 31, 1899".

U. S. Patent to T. A. Edison, No.
386,974, dated July 31, 1888 and the same
is marked "Defendant's Exhibit Edison Pa-
tent 386,974, S.D.O., Ex., May 31, 1899".

U.S. Patent to T. A. Edison, No.
393,967, dated December 4, 1888, and the
same is marked "Defendant's Exhibit Edison
Patent, 393,967, S.D.O., Ex., May 31, 1899".

U.S. Patent to T.A. Edison, No.
393,968, dated December 4, 1888, and the
same is marked "Defendant's Exhibit Edison
Patent 393,968, S.D.O., Ex., May 31, 1899".

U.S. Patent to T. A. Edison, No.
400,646, dated April 2, 1889/ and the same
is marked "Defendant's Exhibit, Edison Patent
400,646, S.D.O., Ex., May 31, 1899".

U.S. Patent to T. A. Edison, No.
414,761, dated November 12, 1889, and the
same is marked "Defendant's Exhibit Edison
Patent 414,761, S.D.O., Ex., May 31, 1899".

U. S. Patent to T. A. Edison, No.
430,274, dated June 17, 1890, and the same
is marked "Defendant's Exhibit Edison Pa-
tent 430,274, S.D.O., Ex., May 31, 1899".

U.S. Patent to T. A. Edison, No.
430,276, dated June 17, 1890, and the same
is marked "Defendant's Exhibit Edison Pa-
tent 430,276, S.D.O., Ex., May 31, 1899".

U. S. Patent to T. A. Edison, No.
434,533, dated October 18, 1892, and the
same is marked "Defendant's Exhibit, Edison
Patent, 434,533, S.D.O., Ex., May 31, 1899".

U. S. Patent to T. A. Edison, No.
434,534, dated Oct. 18, 1892, and the same
is marked "Defendant's Exhibit Edison Pa-
tent, 434,534, S.D.O. Ex., May 31, 1899".

Defendant's Counsel also offers in
evidence copies of the following named
Letters Patent of Great Britain:

No. 2909 of 1877, dated July 30, to
T. A. Edison, and the same is marked
"Defendant's Exhibit Edison British Patent
2909 of 1877 S.D.O., Ex., May 31, 1899".

No. 1644 of 1878, dated April 24th,
to T. A. Edison, and the same is marked "De-
fendant's Exhibit Edison British Patent
1644 of 1878, S.D.O., Ex., May 31, 1899".

Star No. 6027 of 1886, to J.V. Johnson, dated May 4, 1886, a communication from the Volta Graphophone Co. of Alexandria, Virginia, and the same is marked "Defendant's Exhibit, British Patent 6027 of 1886, S.D.O., Ex., May 31, 1899".

Also, copy of petition of International Graphophone Co., dated March 5, 1890, for amendment of original patent number 6027 of 1886, and decision of the Comptroller of the British Patent Office upon such petition. Said documents are secured together, and marked "Defendant's Exhibit Proceedings for Amendment of Patent 6027 of 1886, S.D.O., Ex., May 31, 1899".

Defendant's counsel also offers in evidence two publications entitled respectively, "The Illustrated Official Journal (Patents) Wednesday, 13th August, 1890, No. 64", and "The Illustrated Official Journal (Patents), Wednesday, Fifth November, 1890, No. 96", and the same are marked respectively:

"Defendant's Exhibit Official Journal Nos. 64 and 96, S.D.O., Ex., May 31, 1899".

Further proof of authenticity of the several exhibits above offered in evidence is hereby waived, and it is consented that

in printing the record for final hearing defendants may reproduce in such record only the matter appearing on pages 622 and 623 of "Exhibit Official Journal 34" and that appearing on pages 872 and 873 of the "Exhibit Official Journal No. 96", relating to the amendment of said British Patent Star No. 6027.

Defendant's Counsel offers in evidence copies of the following named Letters Patent of the Republic of France:

Copy of No. 124,213, delivered July 27, 1876, to Charles Cros for New Method of Phonography, and the same is marked "Defendant's Exhibit Cros French Patent 124,213", S.D.O., Ex., May 31, 1899".

Also Certified copy of No. 135,638 dated March 20, 1880, to Charles Weyher, for improvements in a Continuous Phonograph, and the same is marked "Defendant's Exhibit, Weyher, French Patent 135,638, S.D.O., Ex., May 31, 1899".

Defendant's Counsel offers in evidence the following exhibits:

A copy of the article relating to the Lambrigt phonograph, in "Engineering" of April 13th, 1873, Vol. 27, page 327, and

the same is marked "Defendant's Exhibit, Engineering Article on Latham's Phonograph, S.D.O., Ex., May 31, 1899".

A copy of the article commencing on page 266 of the book entitled "Le Telephone, Le Microphone, et Le Phonograph", by Du Moncel, and the same is marked "Defendant's Exhibit Le Telephone Article on Latham's Phonograph, S.D.O., Ex., May 31, 1899".

A translation of the last mentioned exhibit, marked "Defendant's Exhibit, Translation of Le Telephone Article on Latham's Phonograph", S.D.O., Ex., May 31, 1899."

A copy of an article relating to the Gamard phonograph, commencing on page 356 of "Le Microphone, Le Radiophone et Le Phonograph", by Du Moncel, published in Paris, 1898, and the same is marked "Defendant's Exhibit Le Microphone Article on Gamard Phonograph, S.D.O., Ex., May 31, 1899".

A translation of the last named exhibit and the same is marked "Defendant's Exhibit Translation of Le Microphone Article on Gamard Phonograph, S. D. O., Ex., May 31, 1899".

Copy of an article beginning on page 503 of the "Journal of the Society of Telegraph Engineers", published at London

in 1876, Vol. 3, and the same is marked "Defendant's Exhibit, Journal of the Society of Telegraph Engineers Article, S.D.O., Ex., May 31, 1899".

A copy of the article on Gros Phonograph, appearing in "Le Rappel", a newspaper published at Paris, France, Dec. 11, 1877, and the same is marked "Defendant's Exhibit, Le Rappel Article on Gros Phonograph" S.D.O., Ex., May 31, 1899".

A translation of the last mentioned exhibit, marked "Defendant's Exhibit Translation of Le Rappel article on Gros Phonograph, S.D.O., Ex., May 31, 1899".

Copy of an article on the Gros phonograph beginning on page 1062 of Vol. 67, of "Comptes Rendus, des Seances de l'Academie des Sciences", published in Paris, 1877, and the same is marked "Defendant's Exhibit Comptes Rendus Article on Gros Phonograph, S.D.O., Ex., May 31, 1899".

Translation of the last mentioned exhibit, marked "Defendant's Exhibit, Translation of Comptes Rendus Article on Gros Phonograph, S.D.O., Ex., May 31, 1899".

Copy of an article on the Delechenneau Phonograph, beginning on page 1140 of

Volume 83, of "Comptes Rendus des Seances de l'Academie des Sciences" published in Paris, France, in 1878, marked "Defendant's Exhibit, Comptes Rendus Article on Delechanceau Phonograph, S.D.O., Ex., May 31, 1899".

Translation of the last mentioned exhibit, marked "Defendant's Exhibit Translation of Comptes Rendus Article on Gros Phonograph, S.D.O., Ex., May 31st, 1899".

Copy of article on the Carbonel phonograph on page 53, Volume 7, of "Telegraphic Journal, published in London, February 1, 1878, marked "Defendant's Exhibit Telegraphic Journal Article on Carbonel Phonograph, S.D.O., Ex., May 31st, 1899".

Copy of article on Gerard Phonograph in Telegraphic Journal, published in London November 16, 1878, marked "Defendant's Exhibit Telegraphic Journal Article on Gerard Phonograph, S.D.O., Ex., May 31, 1899".

Copy of article on Carbonel Phonograph, beginning on page 390, of Volume 47 of Cosmos, published in France, December 1878, marked "Defendant's Exhibit Cosmos Article on Carbonel Phonograph, S.D.O., May 31, 1899".

Translation of the last mentioned exhibit, marked "Defendant's Exhibit Trans-

lation of Cosmos Article on Carnot's
Phonograph, S.D.O., Ex., May 31, 1899".

Article by Johnson in "Scientific
American" for November 17, 1877, marked
"Defendant's Exhibit Johnson's Scientific
American Article" S.D.O., Ex., May 31, 1899".

Article on Scott's phonautograph on
page 376, Vol. 37 of "Scientific American",
dated December 15, 1877, marked "Defend-
ant's Exhibit Scientific American Article
on Scott's Phonautograph, S.D.O., Ex., May
31, 1899".

Article describing F. M. Phonograph in
"Scientific American" for July 27, 1878,
marked "Defendant's Exhibit F.M. Scientific
American Article, S.D.O., Ex., May 31, 1899".

Article on Edison Talking Machine,
in the Popular Science Monthly for April,
1878, marked "Defendant's Exhibit Popular
Science Monthly Article, S.D.O., Ex., May
31, 1899".

Article in Brooklyn Daily Times, pub-
lished in 1876, marked "Defendant's Exhibit
Brooklyn Times Article S.D.O., Ex., May
31, 1899".

Article from "Journal of Franklin
Institute" for July 1882, marked "Defend-
ant's Exhibit Cooper's Phonograph Article,

S.D.O., Ex., May 31, 1899".

Article in Scribners Monthly for April 1878, beginning at page 655, entitled, "The Telephone and the Phonograph", marked "Defendant's Exhibit Scribners Monthly Article, S.D.O., Ex., May 31, 1899".

It is stipulated that the foregoing publications were published on the dates given in the offers in evidence, and that copies marked in evidence (except such translations) are correct copies, subject to correction by either party if error should appear.

Defendant's Counsel also offers in evidence copy of the drawings of U.S. Patent to T. A. Edison, No. 200,521, dated February 19, 1878, and the same is marked "Defendant's Exhibit Drawing Edison Patent 200,521, S.D.O., Ex., May 31, 1899".

Also copies of Figures 4, 5, 7, 8, 14, 15, and 29 of Edison's British Patent No. 2808 of 1877, and the same are marked "Defendant's Exhibit Copy of Drawings Edison British Patent 2808, S.D.O., Ex., May 31, 1899".

Also copy of the drawing appearing in Webster's Dictionary, illustrating the

definition of the word "burin", together with illustrations of burin point of reduced size, referred to by the witness Vansize, and the same is marked "Defendant's Exhibit Vansize Burin Illustration, S.D.O., Ex., May 31, 1899".

Also copy of Figures 1, 2 and 3 of the drawings accompanying the article in Engineering, April 13, 1879, describing the Lambrigt Phonograph, and the same is marked, "Defendant's Exhibit Copy of Engineering Lambrigt's Phonograph, S.D.O., Ex., May 31, 1899".

Also copy of Figure 3 of the Drawings of U. S. Patent to Reynolds, No. 237,166 October 23, 1883, and the same is marked, "Copy Fig. 3, Reynolds Patent, S.D.O., Ex., May 31, 1899".

Also copy of Fig. 6 of the drawing of U.S. Patent to Reynolds, No. 237,166, October 23, 1883, and the same is marked, "Copy Fig. 6, Reynolds Patent, S.D.O., Ex., May 31, 1899".

Also copy of Fig. 3 of the drawing of U.S. Letters Patent to T. A. Edison, No. 201,760, dated March 26, 1878, and the same is marked, "Defendant's Exhibit Copy Fig. 3 Edison U.S. Patent 201,760, S.D.O., Ex., May 31, 1899".

Also, Copy Fig. 59, of the drawings of British Letters Patent to T.A. Edison, No. 1644 of 1873, and the same is marked "Defendant's Exhibit Copy Fig. 59, Edison British Patent 1644 of 1873, S.D.O., Ex., May 31, 1899".

Also, copy of Figures 60 and 61, British Letters Patent to T.A. Edison, No. 1644 of 1873, and the same is marked "Defendant's Exhibit Copy Figs. 60, 61, Edison British Patent 1644 of 1873, S.D.O. Ex., May 31, 1899".

Also, copy of the drawings of U.S. Letters Patent to Hiram W. Hayden No. 33,623 dated June 9th, 1865, and the same is marked "Defendant's Exhibit, Hayden Patent 33,623, S.D.O., Ex., May 31, 1899".

CROSS EXAMINATION BY MR. MASSIE:

XQ 8. Do you understand the patent No. 341,287 to limit itself, so far as making duplicate sound records is concerned, to making such duplicates upon an iron ~~tablet~~ tablet from an electrotype?

A. The claims are sufficiently ambiguous that a determination of that question must be the result of judicial investigation. Considering the claims in the light of the state of the art and assuming they can be sustained as valid under any circumstances, I should understand that they would be limited to making duplicate sound records upon an iron tablet, and from an electrotype of the original.

XQ 9. What significance do you attach to the statements on page 3, lines 79 to 84, namely,

"The means for transferring from one tablet to another by means of a cutting-tool, although designed expressly for the production of engraved iron records, are believed to possess novelty, irrespective of the nature of the material used."

A. The statement quoted by you does not appear to mean much of anything. It is indefinite and ambiguous. Considered in the light of the state of the art, and assuming that the statement is founded on fact, it must relate to details of construction of the machine shown in Figure 1, as that is the only means of transferring from one tablet to another which is shown. It may be there is some merit in blocking up the electrotype with an emulsion of plaster-of-paris, or that the specific arrangement of the divided independently acting lever

connecting the tracer and the cutting tool is referred to as a novelty. That is the only significance that can be attached to the statement when the state of the art is considered.

XQ 10. What materials for sound records do you assume to be within the knowledge of the patentee at the date of making the application upon which this patent was granted?

A. All those referred to in my answer to the fifth direct question, which include the metals in various forms, waxes and hydrocarbons.

XQ 11. Did the patentee know that sound records could be made upon "wax or a wax-like composition"?

A. Of course I cannot say as a matter of fact; as a conclusion of law he is assumed to know that which is in public print, and wax or waxlike composition was well known, and was described for use in this connection prior to the date inquired about.

XQ 12. Does this patent contain any reference to records made upon such material?

A. In the specification, page 1, line 28, it is stated that:"

"According to the present invention the record is first cut in a comparatively soft material, (preferably wax or a waxy composition) and from an electrotpe of this, or from other suitable record, a copy is made in iron or other suitable material by means of a graver or cutting style which is actuated by the record to be copied. The wax record would not ordinarily have sufficient strength to withstand the pressure to which it would be subjected in cutting the metal, and for this reason the electrotpe is made.

"Another method of preparing a magnetic record would be to plate a thin film of iron upon an elec-

prototype taken from the wax or other suitable record."

XQ 13. Referring to the second sentence you have just quoted, would ~~xxxxxxximpossiblexixxxxxxx~~ the wax record have sufficient strength to withstand the pressure to which it would be subjected in cutting upon a tablet of some other material, not metal, as say another wax blank?

A. I do not think wax could be used with mechanism constructed like that shown in FIG. 1 of the patent in suit, where a longitudinal thrust is made, that is, the tracer and cutter are at opposite ends of a lever, and gentler means are necessary in dealing with materials ~~xxxx~~ softer than those prescribed in the patent. I think with a duplicating machine like that shown and described in Edison's British patent No. 1644 of 1878, that a duplicate could be made on a wax blank taken from a suitable master, such as a wax master record.

XQ 14. I used the word "wax" in my last question, giving it the broad significance attributed by the courts in the case of this defendant against Leeds & Baldwin, and ask, would it be impossible in your opinion to make a duplicate by the apparatus shown on sheet 1 of the drawings of this patent, if a master and blank of (say) ^{blank} the soap-~~xxxx~~ material were used?

A. I could not say it would be impossible; I think it would be very difficult, and of course you could not reproduce from such a blank by the electric means shown and described in the patent in suit. The great trouble with the machine is that longitudinal thrust of the knife,

and if you put the cutting tool in bearings like 212, Fig. 1,, sufficiently large to allow free reciprocation, the tool will chatter and jump; if you make your bearings close enough to prevent this, the free reciprocation will be impeded, and then it is practically impossible to get a master and a duplicate to run true enough on discs arranged like 201 and 204 in Fig. 1. I should incline to the opinion that it would be practically impossible with the machinery shown in the patent.

XQ 15. Did you ever see or examine such an apparatus or anyone at all similar to it?

A. Assuming that you refer to the machine shown in Fig. 2 of the patent in suit, I have seen an attempt made to make such a machine, but it was practically unsuccessful, although the best possible skill was employed, and every effort made to produce success. The result was as I have stated it. The first great trouble is that you can't get the two discs with the disc master and disc blank to run true enough; the cutting tool will either jam or skip.

XQ 16. By whom was this attempt made, about what time, and for what purpose?

A. I think it was made for Mr. Tewksbury by mechanics employed by him, within a year or two last past; the purpose was to demonstrate the possibility of making duplicates in that way.

XQ 17. This is Mr. Tewksbury who ^{was} ~~is~~ ^{xx} one of the defendants in this suit, is it not, and the attempt was made in order to prepare the defense against this present

suit?

A. I saw the instrument I have in mind during my investigations of the matter of duplicating phonograph records in the City of Newark. It was either in Tewkesbury's possession, or in some machine shop, or laboratory in Newark. I was told that the machine was made before the institution of this suit, and had no connection with this suit. The parties contemplated going into the duplicating business, and they wanted to test the feasibility of making duplicates according to the patent in suit. This is a matter of hearsay with me; all that I can say which seems to me relevant to this present inquiry is such a machine was attempted to be made in good faith not for purposes of litigation, as your question seems to indicate a suspicion of such attempt, and the result was that the imperfections of the machine were apparent.

Q 18. Was this visit of yours to Newark before or after this present suit was instituted?

A. ~~I am unable~~ I am unable to say because I began investigating this matter for these same parties in 1894.

Q 19. Was this attempted model for duplicating disc or cylinder records?

A. It was as near like Fig. 1 of the patent in suit as possible, as I remember it; that is a disc machine.

Q 20. Can you say whether or not disc records for graphophones or phonographs were employed to any extent about the year 1894, or within a few years prior or subsequent thereto?

A. Assuming that you exclude the record made

under the auspices of Mr. Berliner, which seems classifiable as a phonograph, I do not know of the employment to any extent of disc records.

XQ 21. Upon what authority do you make the assertion in substance, that when Mr. Edison in his various patents and other publications says "a record of the sound is indented", he does not mean to say it is in fact indented, but merely wishes to indicate the resulting appearance of the record?

A. Edison describes the use of paper, paper coated with paraffine or wax, tinfoil, and other materials. The only material that can be indented within the limited meaning of the term which the complainant seeks to establish, is tinfoil, or a foil, or paper, some material which can be embossed. Edison uses the term indifferently and that is the reason I have for believing that he used the term without the limitation to embossing. He speaks of indenting the foil as well as other materials, and does not limit the use of the term to embossing. Besides that definition in the dictionary indicates that "indent" and its derivatives means the forming into notches, such as would be the record made by the human dental apparatus applied to a cake of wax, and there is no reason to believe that Mr. Edison used the term in other than its dictionary significance.

XQ 22. In referring to the alleged translation of the article in Le Reppel that undertakes to describe the cross phonograph, you discuss the French phrase,

"les traces s'y marqueront en creux", and say that a satisfactory translation of this phrase is "the lines will be gouged out", giving as your reason for this opinion that the verb "marqueront" means "mark, stamp"; and that the noun "creux" means "hollow, cavity, pit, hole, chasm, gutter". Might not the phrase be translated literally, will
 "the lines ~~xxx~~ be marked in hollows", or "will be stamped in holes or pits"?

A. If you ask about the possibility, of course that exists. But the correct rendering seems to me to be as I have stated it. I do not however wish to influence your conclusions by any attempt I may make to translate the French. You should refer the matter to a French scholar. My use and researches in the French do not enable me to speak with authority.

~~xxxxxx~~. Recess from 1 to 2 P.M.

XQ 23. In your answer to direct question 5, you refer to a number of publications and patents disclosing Mr. Edison's work. Please state whether or not the Johnson article in the Scientific American for November 17, 1877, describes or contains any reference to a duplicate of the sound record?

A. Toward the end of the article a form of duplication is described in which the master is made, for instance, in Washington, and the duplicate is made in New York, by the aid of the electric circuit. The article states, ~~xxxxxxx~~ referring to Mr. Edison:

"He has already applied the principle of his speaking telephone, thereby causing an electro magnet to operate the indenting diaphragm, and will un-

doubtedly be able to transmit a speech, made upon the floor of the Senate, from Washington to New York, record the same in New York automatically, and by means of speaking telephones re-deliver it in the editorial ear of every newspaper in New York."

I understand that refers to the phonographic transmission of the sounds from an original in Washington to a duplicate in New York, and the subsequent transmission from that duplicate or a series of duplicates to various editorial offices in New York City.

XQ 24. Question repeated with regard to U.S. patent No. 200,521?

A. The patent 200,521 to T.A. Edison, dated February 19, 1878, describes or contains a reference to a duplicating of the sound record. This occurs at page 2, column 1. I quote the statement:

"The record, if it be upon tinfoil, may be stereotyped by means of the plaster-of-paris process, and from the stereotype multiple copies may be made expeditiously and cheaply by casting or by pressing tinfoil or other material upon it. This is valuable when musical compositions are required for numerous machines."

XQ 25. Question 23 repeated with respect to British patent 2309 of 1877?

A. Yes, British patent 2309 of 1877, describes or contains an illustrated reference to a duplicate of the sound record. On page 6, beginning at line 35 occurs the following:

"I am enabled to record the sounds produced by the human voice, or otherwise, by causing the movements of the diaphragm to be registered on paper or soft sheet metal, and then the paper may be used in an instrument to reproduce the sound upon a delicate diaphragm by giving to the same a vibration similar to that originally given by the voice."

"h, Fig. 4, is the indenting transmitter, the diaphragm having a knife-edge point. 1 is the paper which has previously been passed through a machine to raise a V-shaped rib 6. The movement of the diaphragm of h, when the drum is in motion, causes the knife-edge point 1' to indent the raised rib to varying depths, according to the amplitude of vibration of the diaphragm, thus these indentations represent accurately all the tones and varying inflexions of the human voice. The paper after being indented is passed through a second apparatus n Fig. 5, almost similar to h. A spring 9 has a knife edge which rests upon the raised indented rib 6, the spring being connected to a delicate diaphragm 10 by a string or straw.

"The indented rib reproduces in the spring 9 the movement of the indenting point, and either by direct action, or through the vibration of a string, conveys the same motion to the diaphragm of n, and reproduces previous sounds. If these sounds are to be transmitted over a telegraph line the diaphragm 10, see Fig. 6, is provided with a cork disc w and fibrous tension regulator t, before described, to produce the rise and fall of electric tension on the line. The sound may be recorded in ink as represented in Fig. 7. The diaphragm of h operates a very flexible self-feeding pen o, and causes the continuous line to be wide or narrow, according to the amplitude of vibration of the diaphragm. The ink should dry quickly and the strip may be passed at any time thereafter through the instrument shown at Fig. 8, beneath the arm 12, having a point or points resting on the paper; this arm is connected with a resonate diaphragm, and the ink marks produce more or less friction, according to the breadth and amount of ink deposited, and this will set the diaphragm of n vibrating, and reproduce the vibrations of the diaphragm h."

You will notice that in Fig. 4 the original or master record is shown as being formed. In Fig. 5 the master record 1 communicates its record to a diaphragm in a telephone transmitter. This transmitter is in circuit with a receiver, telephonic, shown in Fig. 7, which makes the duplicate record on the moving strip, and this moving strip is passed under the reproducing point shown in Fig. 8, rendering audible the sound imprinted on the master record. The telephonic apparatus employed

for reproduction and for recording is more practical than that shown and described in the patent in suit, because in the latter induction is depended on while in the case of the Edison patent direct mechanical movement is imparted to the telephone transmitter.

XQ 26. Do you regard the electrical reproduction ~~xxxxx~~ from the sound record as pertinent to the issues of this suit?

A. I do not understand that claims involving telephonic reproduction, or electrical reproduction, are alleged to be infringed, unless it should transpire that the court regards the claims numbered 4, 14, 15 and 16, as necessarily involving the entire method described in the patent. But the answer to the 25th XQ involved a full description of Edison's arrangement for electrical duplication, as that was embodied in the British patent.

XQ 27. Do you understand that in transmitting these sounds over a telegraph line a record - a tangible record - is made at the receiving end? If so, please specify where such record is described?

A. The statement which I have quoted is a concise and illustrated description of the process of recording and duplication. The record is first made by the knife-edge point attached to a diaphragm, cutting the embossed rib i, as shown in Fig. 4. The strip i is next taken and passed under a reproducing point, as shown in Fig. 5, which point is mechanically connected to the diaphragm of a ~~transmitter~~ telephone transmitter. This transmitter is inserted with the telephone receiver shown in Fig. 7. The

diaphragm of this receiver operates a recording point indicated by the letter o. The duplicate record thus made is passed under the reproducing point which is connected to a vibrating diaphragm, as shown in Fig. 8. The particular part of the specification relating to the formation of the duplicate record, appears in the British patent at page 6 line 55, and extends to the end of the first paragraph at the top of page 7.

XQ 28. As I understand ~~the patent~~ from your descriptions, is it not correct that Mr. Edison has shown several different methods of making the sound record in the first instance, one, being by indenting the V-shaped rib, and another being by spreading ink in a line of varying width, corresponding to the amplitude of the sound vibrations?

A. In the British patent 2909 there is a description beginning at page 6, line 35, and terminating at page 7, line 6. This is a consecutive and concise statement referring to four successive figures of the drawing, and describing the telephonic reproduction of a record, a sound record, a duplicate sound record, Where the duplicate record is made, as in this case, by electromagnetism operating the diaphragm, a means of recording which involves the exercise of less force or power is employed ; so that, instead of cutting, as shown in Fig. 4, the duplicate is made by a self-feeding pen, as shown in Fig. 7, and to that extent it is true to say that two different methods of recording are shown.

XQ 29. Inasmuch as line 50 of page 6 refers to setting in motion a diaphragm of n and reproducing previous sounds, and line 5 of page 7, referring to the ink record also describes setting the diaphragm of n vibrating and reproducing the vibrations of the diaphragm of h (which is the diaphragm that operates the pen o) does it not seem probable that the view shown in Fig. 7 is an alternative construction to that shown in Fig. 4?

A. No, I do not think so. The view of the matter which you seem to favor is not consistent with the statement quoted and which is a consecutive statement, beginning at line 35 on page 6 and terminating with line 6 on page 7. The apparatus in Fig. 4 makes the master record.

In Figure 5 we have the same record i operating the diaphragm of a telephone transmitter. In Fig. 7 we have the telephone receiver which is making the duplicate record, and in Fig. 8 we have the audible reproduction of this duplicate record.

XQ 30. You say that Fig. 7 is in circuit with the receiver. Please specify where this statement is found in the patent?

A. The specification states:

"If these sounds are to be transmitted over a telegraph line the diaphragm 10 (see Fig. 6) is provided with a cork disc, ~~box~~ w, and fibrous tension regulator t before described, to produce the rise and fall of electric tension on the line."

A section of telegraph or telephone line is shown extending to a distant station, and the master record i is shown in position in connection with this telephone transmitter.

Anyone understanding the art of telephony would understand that the transmitter was connected by this section of line with the receiver at the distant station.

XQ 31. To sum the matter up, then, you understand the "diaphragm of h" shown in Fig. 7, to be the receiver of the telephone, and not the recorder of a phonograph, as the h of Fig. 4?

A. It is both. It is the diaphragm of a receiving telephone, as it appears in Fig. 7, and operates to make a reproducible sound record through the medium of the self-feeding pen o. In Fig. 4 there is a recording knife or chisel point, and an instrument h with a diaphragm to which the chisel is attached.

XQ 32. How are the copies or duplicates of sound records, described in Scribner for April 1878, made?

A. The only reference to the specific character of the duplicates which appears in the article in Scribner's Magazine, page 857, near the bottom of the first column. I quote:

"The sheet of tinfoil or other plastic material receiving the impressions of sound, will be stereotyped or electrotyped so as to be multiplied and made durable; or the cylinder will be made of a material plastic when used and hardening afterward. Thin sheets of paper mache, or of various substances which soften by heat, would be of this character. Having provided thus for the durability of the phonograph plate, it will be very easy to make it separable from the cylinder producing it, and attachable to a corresponding cylinder anywhere and at any time."

I understand from that that there are electrotyped or stereotyped duplicates referred to, as well as the duplicates which are made by rolling the master record in con-

tact with the surface of the blank to be duplicated, substantially as described in Edison's British patent No. 1644 of 18788

XQ 33. Do the methods of duplicating indicated by this article involve the use of "the follower having a fine though blunt edge for rubbing over the record, " and "the non-rotary cutter movable with said follower for engraving the record" on the blank tablet?

A. That would be an obvious way of making the duplicate, and it was known at the date of the article in Scribners, but it is not specifically described in the Scribner article referred to.

XQ 34. Does the Mayer article in the Popular Science Monthly, of April 1878, describe a duplicate?

A. The article inquired about does not refer specially to duplicate records. It describes original or master records, and only inferentially describes the duplicates insofar as a duplicate resembles a master record.

XQ 35. Is there any reference to the art or process of making duplicates?

A. Only so far as the making of an original resembles the making of a duplicate. I do not regard the arts as distinctive. The Mayer article referred to does not speak of duplicates, but it describes scientific facts regarding the material and manufacture of sound records.

XQ 36. The last question repeated with respect to the article in Brooklyn Times of 1878?

A. The article in the Brooklyn Times referred to, of which I have only an extract, describes an original sound record engraved on a piece of sheet copper one-thirtieth of an inch thick, which had been wrapped around the cylinder of a phonograph. While this is not described as a duplicate, the operation of producing it and the materials of which it is made are substantially the same as those of a duplicate or copy, so that in one sense it may be said to describe a duplicate, and in another sense it does not. The article was referred to by me particularly for the purpose of showing the state of the art in making original records, and is only incidentally of value as showing that engraved records were made on copper cylinders..

XQ 37. The last question repeated with regard to Edison's U.S. patent No. 227,679?

A. In Edison patent No. 227,679, there is no particular reference to the function or operation of a machine employed to make duplicates from an original sound record.

Adjourned to Thursday, June 1, 1899, 10.30 A.M.

New York, Max June 1st, 1922, 10.30 A.M.

Met pursuant to adjournment.

Present, counsel as before.

CROSS EXAMINATION OF MR. HANSINE CONTINUED:

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XQ 38. Does the article signed "F.M." in the Scientific American of July 23, 1878, describe any apparatus for making duplicates?

A. The article referred to describes an improvement in the phonograph apparatus and in one sense this is as much applicable to duplicating machinery as to the simplest form of phonographic instrument. The article does not speak of using the machine to make duplicates, however.

XQ 39. Is this apparatus capable of being employed as it stands for making duplicates?

A. If the cylinder is long enough to support two separate record tablets, it could be used to make duplicates. It would be necessary to employ a lever making contact with both cylinders. The intention of the writer of the article seems to have been to describe only a simple phonograph instrument or apparatus.

XQ 40. Does the Cooper article in the Journal of the Franklin Institute describe an apparatus for making duplicates?

A. The fragmentary portion of the article which I have before me does not refer to the use of the instrument or apparatus for purposes of duplication, but by simple mechanical modifications the instrument would be susceptible of such use.

XQ 41. Is any such mechanical modification described, or even hinted at, in this article?

A. It is a question exactly what you mean by "hinted at". You understand that a duplicating instrument is only an extension of the parts of the simplest form of instrument using two cylinders where one is used in the simpler form, and it would not be proper to say that the Cooper article describing the simple phonographic instrument does not at the same time describe a duplicating instrument, because it is only a duplication of the parts which are described. In one sense the Cooper article does not describe duplication, and in the sense explained, it does.

XQ 42. Then, in your opinion, the Cooper article does in one sense describe a duplicating apparatus. Please describe briefly the nature of this duplicating apparatus?

A. The article in the Franklin Institute Journal, attributed to W.B. Cooper, dated May 17, 1882, describes a circular cutting tool rapidly revolved in a plane at right angles to the movement of a strip, plate or cylinder, against which it is pressed by the pulsations of the diaphragm, or the cutting tool may be stationary, and the record tablet vibrated by the diaphragm. The simple form of instrument so described could, ~~be~~ by obvious mechanical duplication, be made to produce duplicates. You will notice that the phonograph instrument is a form of small lathe, and the same idea is familiar in mechanics for

duplicating irregular surfaces or irregular forms, so that while the Cooper article describes the simpler form of instrument, the amplification is merely a mechanical modification obvious to machinists.

XQ 43: Does this Cooper article disclose or suggest any mechanical duplication for producing duplicates of the record?

A. It does not use the term "duplication", and does not describe the amplification of the apparatus, which I refer to in my last answer, but the point I wish to emphasize is that, as the article describes a form of phonograph apparatus, - that is, a small lathe - and as duplicating lathes were well known in the art at that time, this Cooper article may, in that sense, be said to describe the duplicating apparatus of a specific form, although it does not use the words "duplication" or "duplicates".

XQ 44. In your opinion, then, an inventor who discloses to the public a new article of manufacture, thereby discloses the apparatus for making a copy or duplicate of such article?

A. That is almost too general a statement, and does not quite touch the condition of affairs in the present instance. As I have repeatedly explained to you, the phonograph instrument is a small lathe in which the movable cutting tool is upon a rest or diaphragm capable of vibration by sound waves. Duplicating lathes were well known at the date inquired about, and the duplication of cylindrical sound records was well known, and the description of a simple form of lathe mechanism under

those conditions for use in the phonographic art, is a substantial description of machinery for duplicating.

XQ 45. How are the copies of the Carbonnel records made? as described in the *Telegraphic Journal*, or in *Cosmos*

A. Carbonnel describes a phonographic sound record consisting of a band of copper coated with a thin layer of wax. The diaphragm with its recording point removes the wax and the copper is then etched with nitric acid. This is the well known master record. As a modification, a backing of paper with thick albumen in a sheet or layer on the surface of the paper is employed. This is hardened, and indentations are made in the tablet more or less deeply, according to the intensity of the sound. This master record is described as a stereotyped plate, and I understand from that the intention to duplicate the record by the stereotype or electrotype process.

XQ 46. Does the article ~~xxx~~ in the *Comptes Rendus* descriptive of the Delechenneau ^{phonograph} ~~apparatus~~, disclose any apparatus for making duplicates?

A. Delechenneau takes the existing phonograph machine, and with it employs zinc or brass cylinders for the record tablet, thus obtaining "a real engraving of speech on an unyielding metal". The apparatus disclosed is in the same category with those discussed by us, and in my opinion, the description of a phonographic apparatus in its simpler form, which is the description of a small lathe apparatus, is practically a description of a duplicating apparatus, because the amplification or duplication of the apparatus was well known in the phonogra-

phic art, and in the old art of duplicating lathes. It is unimportant that the extract which I have before me does not use the word "duplicate" or "duplication", because the mechanical modification was obvious and well known.

XQ 47. How are the copies of the Lambrigt record, described in Engineering, or the Journal of the Society of Telegraphic Engineers, produced?

A. The master record is made upon a form of tablet consisting of a backing of glass coated with stearine wax. The recording tool cuts the record in the wax, and an electroplate is made from the wax master record. This serves as a matrix into which lead is pressed or squeezed until it takes the same form given by the master record to the electrotpe.

XQ 48. Does the French patent to Weyher, No. 135,638, disclose any apparatus for making duplicates of sound records?

A. The Weyher French patent referred to describes the engraving of the sound record by means of a burin or engraving tool, but does not specially refer to the duplication of such record.

XQ 49. Please state what apparatus for making duplicates of graphophone or phonograph sound records you have seen or examined, other than electretyping and casting or stamping apparatus, if any such latter class there be?

A. I have seen an apparatus made in accordance with the description contained in Edison's British

patent of 1878, No. 1644, and the apparatus operated by the defendants, which, as I recall it, is substantially like that shown in "Complainant's Exhibit Diagram Defendant's Duplicating Apparatus". These are practically two simple phonograph instruments geared together, or two small lathes geared together. It is sometimes called a lathe for engraving, and sometimes a lathe for turning irregular forms.

XQ 50. Is the apparatus you mention in the beginning of your last answer, the one referred to in direct question and answer 7, of this examination?

A. There is no distinction to be made between the two forms of apparatus referred to. They are both like Edison's British patent in all substantial respects, and I had in mind the single instrument made to form an exhibit in the present deposition, which is referred to in question 7, and an instrument seen in the United States Phonograph Company's possession, in Newark, New Jersey.

XQ 51. Have you ever examined any other duplicating apparatus, except those of the two types you have just referred to? By duplicating apparatus, I mean apparatus for making duplicates of sound records, as indicated in XQ 49.

A. I have seen duplicating lathes, and lathes for turning irregular forms. They are all substantially the same thing. I don't think there are any other forms of duplicating apparatus. There is the simple phonograph, and you connect two of these together by a belt, then you have a duplicating apparatus

XQ 52. What material is operated on in the apparatus disclosed by the Casselman patent, 12,192?

A. The specification, page 2, column 1, states:

"In operating with this machine the pattern is secured concentrically upon the table D', and the wood, stone, or other material to be operated upon, secured to the tables D D, when the machine may be set in motion."

I understand from that that any material is to be operated upon which it is desired to duplicate.

XQ 53. How do the delicacy and intricacy of the contour of the disc in the Casselman patent, compare with the irregularities of a sound record?

A. There is no appreciable difference. The Casselman patent is not limited to any size or proportion or to any material, or to any purpose for which the pattern and its duplicates may be appropriately applied. A mechanic in constructing a duplicating machine of the Casselman patent, would provide tools and proportion the size of the parts to the work to be performed. The specification states: "The cutting tool may be of any description commonly used in turning the material to be operated upon". In making this duplicating machine for phonograph purposes, the tools and proportions commonly employed in phonograph apparatus would be employed.

XQ 54. What is the material operated on by the apparatus described in the Spring patent No. 23,957?

A. The specification describes the machine and says that in it "may be placed any desirable pattern projecting beyond the acting face of D, and this pattern

may be adjustable. In the particular instance illustrated q and r are formed for turning awls, or machine needles." I understand the duplicating lathe described in this Spring patent, is to be used for duplicating articles of any material supported at one end, the opposite end being left free and unsupported.

XQ 55. Do you know in what class of invention this Spring patent is classified by the Patent Office?

A. I do not.

XQ 56. What material is operated on by the apparatus disclosed in the Hayden patent? No. 38,823?

A. Any material may be operated on, and the machine is remarkably well adapted to duplicating cylindrical sound records. The patent describes the apparatus as adapted for engraving circular articles, and mentions lamp stands, &c., as a specimen of the work it is adapted to do. It is practically an engraving machine constructed like a duplicating lathe, or a lathe for turning irregular forms.

XQ 57. Does not "the nature of the said invention consist in a method of ornamenting lamp stands and similar articles"?

A. The specification says that the described process or function of the machine is "engraving circular articles"; whether or not the engraving is ornamental would be determined by the character of the engraving, and what might be considered ornamental by one might be considered the reverse by another. The line traced by the engraving tool is a helical line in the surface of a cyl-

inder, or a cylindrical form, substantially like a cylindrical sound record.

XQ 58. Do you not gather from reading the specification as a whole, the reference to the prior state of the art, lines 16, to 23, and the language employed in lines 24 to 27, and in 33, 36, that the result obtained is an article that appeals to the eye?

A. In case of the lamp stand, it is undoubtedly true that engraving the exterior is for the purpose of appealing to the eye, as you express it. But it is undoubtedly true that the same machine applied to duplicating phonograph cylinders would be equally useful for the purpose intended.

XQ 59. What is the material operated on, in the patent to Von Hofe No. 134,493 ?

A. The engraving machine described in the Von Hofe patent is called an Improvement in Glass-Cutting Machine, and glass is shown and described as being cut or engraved, the master or pattern controlling the engraving tool, substantially as is the case with the corresponding element in the various duplicating machines met with in all the various mechanic arts.

XQ 60. Could the apparatus described in the VonHofe patent be employed without reconstruction to make a copy or duplicate of a graphophone record?

A. I do not understand there is any material distinction between a graphophone and the well known phonograph, and that in phonographs the records are made in sinusoidal lines. The machine described in the

Von Hofe patent could be used without change to duplicate cylindrical tablets having sinusoidal records engraved in their surface. If the line is a true helical line, as in some of the phonographs of the present day, the machine would necessarily have to be changed to engrave an undulating line instead of a sinusoidal line.

XQ 61. By undulating line, I understand you to mean a vertically undulating line, as distinguished from the lateral "zigzag", the vertical undulating line being that described in U.S. patent 314,241?

A. I did not contemplate the use of a zigzag line in the phonographic art, and the undulating line I referred to was, of course, the vertically undulating line familiar to the public through the patents and literature and apparatus introduced by Mr. Edison. The line described in patent 314,241 is substantially the same as that occurring in the Edison record.

XQ 62. In the Edison patent No. 213,554, and the Rodgers patent No. 277,349, what is the operation of the "recording point" upon the "blank sheets"?

A. The Edison patent states that "the object of this invention is to indent upon a sheet of paper the characters received from a distant station." and the same is substantially true of the Rogers patent referred to.

XQ 63. Does either of these patents show or describe a cutting-tool?

A. They both show and describe a cutting-tool, or a tool that will cut when suitable material is pre-

mented to it for the purpose of cutting. The question of cutting or embossing is solely dependent upon the material to be operated upon. The two patents in question use either foil or paper, and the recording point operates to emboss such material.

XQ64. Does the apparatus of the ~~K&K~~ Fogelberg & Graves patent No. 250,540, produce a copy or duplicate of the master employed?

A. As described in the patent the master record marks the surface of the duplicate or blank, and this is subsequently either cut or provided with projecting points in accordance with the demands of the instrument in which the musical cylinders are to be employed. The patent in question shows and describes apparatus which would operate upon wax cylinders to complete the operation while with metal cylinders, or wooden cylinders, the mechanical process is supplanted by hand work.

XQ 65. Please state which is the master record and which the duplicate or copy in the Hall patent No. 219,939?

A. There is no distinction between the two sound records; one is the complementary part of the other; that is, where you direct the music or sound into one of the mouth pieces, that record appearing on the opposite side of the diaphragm would resemble what we call the master record, and that appearing on the opposite side, having depressions representing elevations in the master record, would be the duplicate. It depends altogether upon which mouth piece you talk into, or direct

the sound into.

XQ 66. Is the "half-record" on either cylinder employed, or intended to be employed, to produce the half-record which is not a copy thereof, on the other cylinder?

A. The two records are duplicates and each is complete in itself. As described, the instrument is designed to reproduce from both simultaneously, so as to get a more emphatic or louder reproduction, just as we might use two reproducing points and two records with one diaphragm in the well known phonograph to-day. In the Hall patent, each of the sound records is a full and complete record in and of itself.

XQ 67. Have you found any U.S. patents to Mr. Edison, that show or describes an apparatus similar to that shown by Figure 59 of his British patent No. 1644 of 1878?

A. I have not found any issued United States patent showing Fig. 59 of the British patent referred to, but I believe the subject-matter inquired about was for some time a pending application in the United States Patent Office.

~~are~~
~~XXXXXX~~ XQ 68. What ~~ix~~ are the grounds of this belief of yours?

Recess from 1 to 2 P.M.

A. I regard the apparatus employed by the defendants, as appears in the complainant's testimony, as practically identical with the exhibit referred to. The only perceptible difference is the obvious mechanical modification in which a compound lever is substituted for a simple lever.

XQ 72. Can you state what is the title or subject-matter of the record both master and duplicate of the "Defendant's Exhibit Vansize Model of Duplicating Apparatus, Edison's British patent of 1878"?

A. The model was made by Mr. Capps of Newark, and after it was completed the master ~~xxxxxx~~ and duplicate were made. I was not present, and do not know what the record contained.

XQ 73. Do you know whether or not the tinfoil wrapped around the two cylinders in said exhibit contains any record of articulate sounds?

A. I do not know of my own knowledge whether the sound is articulate or is due to the vibrations produced by a musical instrument.

XQ 74. Can you say that the said tinfoils contain a musical record?

A. I can only say from what might be called hearsay. The mechanic was instructed to place a master record and a duplicate made by it in position, and he returned the instrument in its finished condition. My assumption is that he has complied with my instructions regarding the manufacture of the record as he did in

making the machine.

XQ 75. You have no knowledge, either direct or by audible hearsay, whether any reproduction was obtained from the duplicate record on said exhibit?

A. I have not.

XQ 76. I understand that the lever containing the tracing and recording tools is pivoted to allow vertical movements. What raises this lever?

A. I don't understand what you mean by raising the lever. The lever would naturally rise and fall to a very minute extent with the indentations in the foil.

If that is what you mean by "raises the lever", the master record I suppose would be the moving cause.

XQ 77. Do you consider the tinfoil record sufficiently rigid and unyielding to raise this lever?

A. It depends upon what you mean by "raise the lever". If the minute rise and fall due to following the sound record is what you mean, I should think the foil would be sufficiently rigid to produce some movement. Of course the tinfoil is more or less defective for record purposes, and harder metals are preferable. Perhaps I should say harder substances. The apparatus of Figure 59 will produce much better results with another form of record material. The machine itself is all right so far as duplicating is concerned, but the tinfoil is a weak feature. I directed the use of tinfoil in the model so as to eliminate the question of the material of which the record and duplicate was composed from the discussion, and I desire to be extremely fair in the construction of

the model. If you think it desirable I will recommend to the defendant as a means of testing the utility of the two-cylinder machine, that a wax cylinder be substituted for the tinfoil cylinder or cylinders, or that the modern metallic soap cylinder be substituted.

XQ 78. I judge from your last statement that you regard it as immaterial whether tinfoil, wax, or metallic soap be employed in testing the operativeness of this exhibit duplicator. Are you also of opinion with regard to the duplicating apparatus of the patent in suit that it is immaterial whether the materials employed be electrottype master and iron ~~xxx~~ blank, or wax-like master and blank, or metallic soap master and blank?

A. The model of Fig. 59 of Edison patent 1644 of 1878 I believe will duplicate with a master record and blank composed of tinfoil; that it will also duplicate with a wax record and with a metallic soap record, the blanks being of corresponding material in each instance. In each case there would of course be the ~~xxx~~ disadvantages incident to the use of the various materials and also the advantages. In considering the apparatus of the patent in suit, I have yet to learn that it is useful for any purpose. But I think if it is susceptible of any use whatever, such use must be found in the employment of very hard material, hard as compared with either the wax and paraffine forming a coating for the paper, characteristic of Bell & Tainter's work, or the metallic soap, which is characteristic of Edison's work. To get any

useful result from the apparatus of the patent in suit, I think you will be forced to use an electretyp master which is really not a master at all, but a duplicate, and a triplicate of some other material, perhaps this may be iron, but I think a softer material would be more likely to yield some beneficial result.

XQ 79. Returning to the discussion of defendant's Exhibit Duplicating Machine, how does the path of the tracing tool while the process of duplicating is going on, compare in length with the path of the recording tool?

A. I should say they are substantially the same, but microscopically considered, the path traced in the duplicate would, if we employ a somewhat larger cylinder and multiply the gear to a slight extent, be slightly extended, as compared with that in the master. In the model the difference in speed of rotation and the size of the cylinders is very small, and practically amount to nothing, so that the path of the two tools is practically the same.

XQ 80. Is it not a geometrical truth that the path described by a point on a pivoted line at a given distance from its center is greater than the path described by another point on the same line nearer the pivotal point of the line, the relative lengths of the two paths being proportioned to the distance of the respective points from the pivot point of the line?

A. If I understand the question, it seems probable that that would be so.

XQ 81. The exhibit under discussion, and Fig. 59 of the Edison British patent of 1886 show the tracing tool as about midway between the pivot point and the recording tool. With this construction will not the recording tool, when the lever is vibrating, travel about twice as far as the tracing tool?

A. I suppose you mean, will it not cut deeper, that is, will not the cutting point on the blank have a greater extent of movement than the tracing point on the master record. If I correctly understand the question I should think it would cut somewhat deeper, and move somewhat more than the tracing point. The result of this would be to make the duplicate with a somewhat deeper record line than is found in the master. Of course these movements and excursions are microscopical and we can only determine it on the mathematical basis which seems to have occurred to you. This is in accordance with the descriptive portion of the specification, where the amplifying or increasing the size of the indentations is referred to?

XQ 82. I am not prepared to admit that this device shown in Fig. 59 is operative at all; but assuming for the present that it is, and that the instructions given in the patent are followed, namely, that the cylinder containing the blank travels faster, is not the result that the record cut in the duplicate is about twice as deep and about twice as long as a corresponding indentation in the original?

A. That depends upon the construction of the parts and the proportioning. I could not say that your numerical estimate is correct, and can only go to the extent of saying that the record in the duplicate would be somewhat amplified or increased in size, and that the ratio would be dependent upon the construction of the machine.

XQ 83. Assuming that the tracing point is midway between the recording point and the pivot of the lever, which seems to be the case, the indentation made in the duplicate is about twice as deep as the indentation in the original. In order to have the bottom line forming the contour, as it were, of the duplicate record correspond to the similar contour line in the bottom of the master, is it not necessary that a given indentation in the duplicate be about twice as long as the corresponding indentation in the master?

A. Without making a special experiment to determine the matter inquired about, I could not be certain that you are correct; but if the assumption contained in the question is correct, it would seem desirable to modify the duplicate in all respects in substantially the same proportion, and I should expect that a careful constructor would so arrange the apparatus. Of course if the duplicate record was modified in regard to the length of the undulations, the apparatus for reproducing from the duplicate could be made to adjust the difference and to compensate for the extent in length by variation

in the movement.

XQ 84. To produce an indentation in the duplicate of substantially twice the depth and twice the length of the corresponding indentation in the original, would require practically four times the power necessary to make the indentation in the original, would it not?

A. It might do so, but as the process is a purely mechanical one and the motor power is practically unlimited, it would be unnecessary to consider the power factor which you inquire about.

XQ 85. Assuming that the device under discussion is operative, what is it that causes the lever to be lowered, that is, what holds it in constant contact with the bottom of the various depressions or indentations of the master?

A. The gravity of the lever, or its equivalent, which would be a spring, well known in mechanics as an equivalent for gravity, the converse being also true, would ~~xxxx~~ cause the lever to be held in contact with the record.

XQ 86. In the lever fulcrumed at one end, where is the greatest leverage due to its own weight obtainable; at a point near the pivot, or at a point farther removed towards the free end of the lever?

A. I should suppose it would be at a point near the fulcrum, but in the particular instrument under consideration, and with the arrangement shown, there would be practically no difference between the leverage at the two points of contact.

midway of the lever, is not the force exerted at that point twice as great as the force exerted at the tracing tool; in other words, is not the pressure upon the master record twice as great as the pressure upon the blank?

A. Theoretically that might be so, but practically there does not seem to be enough difference to influence the result, and of course the constructor would vary the proportions if the matter inquired about was of any practical importance.

XQ 88. We have seen that the force exerted upon the recording tool is practically four times as great as the force employed in making the original or master record, also, that the pressure exerted upon the master in this duplicating machine is twice the pressure exerted upon the recording tool, and that the pressure exerted upon the master in the duplicating apparatus is eight times as great as the pressure originally exerted to produce such master. How is it that when a given force is applied to the tinfoil in the first instance, the latter yields to the pressure and is readily indented, whereas when eight times the force is applied to the same tinfoil the latter instead of yielding to the pressure resists it and raises the lever?

A. Without assenting to the assumption of your question, I should say that the mathematics appear formidable only upon a theoretical consideration, or for litigious purposes, and that in the practical manufacture

of the simple apparatus shown in Fig. 59 no trouble is encountered.

X) 89. Has it ever come to your knowledge that a ~~maximal~~ physical law in pure mechanics ceases to operate when the dimensions of all the elements involved are reduced in size?

A. No, I should not think that the reduction in size would avoid the law of physics.

Adjourned to Friday, June 8, 1939, 10.30 A.M.

New York, June 2nd, 1899, 10.30 A.M.

Met pursuant to adjournment.

Present counsel as before.

CROSS EXAMINATION OF MR. VANSIZE CONTINUED:

XQ 90. Referring to the Edison U.S. patent No. 201,760 of March 26, 1878, please state where the valve b is pivoted?

A. The specification states:

"I make use of the vibrations of a diaphragm to operate a valve b that is connected with the diaphragm a, preferably by a section c of india-rubber tubing. The diaphragm is to be enclosed in a proper case, that directs the sound upon the diaphragm, and the valve is, by preference, balanced by being pivoted in the center, so that the pressure of the air, steam, or gas upon the valve does not interfere with its movement."

The drawing shows this valve as a rectangular strip having approximately four times the length as compared with the breadth. It is pivoted at the center of one end to the wall of the tube containing the column of air under pressure.

XQ 91. Please state what is intended to be represented by the shaded portion arising from the lower side of the pipe e just below the point indicated by reference letter i in Figs. 1 & 3 of the patent?

A. I understand the part referred to is a partition extending across the tube or pipe to meet the door or valve b.

XQ 92. Do you think that the downward vibration of the diaphragm a (in Fig. 1) would operate to close the valve b against this partition and against the force

of the column of air, steam, &c., escaping otherwise into the pipe k, since the vibrations of the diaphragm are to be communicated through the elastic section of rubber tubing g?

A. Yes, there would be a tendency to close sufficiently marked to vary the mechanical connection which the column of air establishes between the diaphragm a and diaphragm l.

XQ 93. Please state whether or not in your opinion the operation of pipe e with valve b, and having the column of air, steam, &c., passing therethrough, is at all similar to a reed organ pipe in its operation?

A. So far as the organ pipe contains a column of air it might be said to be similar to the pipe and column of air in the patent in question; but as I understand the organ construction the organ pipe contains a vibrating reed or a reed which is vibrated by the passage of the air column, while the Edison patent has a gate or valve which is controlled by external mechanical means.

XQ 94. What is the effect in a pipe having a column of air escaping therethrough when the exit or passage of this column of air is contracted and enlarged alternately?

A. You do not state sufficient facts to form an opinion. If you have a hypothetical structure in mind you should state all the details of construction. I do not understand the question as it stands.

XQ 95. Given a pipe, a column of air, steam, &c., passing through the same and a flat valve controlling the size of the passageway, and itself operated from without, then what is the effect of alternately closing and opening this valve?

A. I do not understand what you mean by controlling the size of the passageway. If you are attempting to describe the peculiarities of the structure shown in the Edison patent, you are either intentionally or unconsciously omitting an essential feature of the structure in this, that in the Edison arrangement shown in the patent, when the gate is open, leaving a passage in the wall of the tube, it is closed across the passage, and the passage of air is blocked, and that would be the effect of alternately closing and opening the valve.

XQ 96. Assume a structure like that shown in Fig. 1 of the patent, except that instead of having the valve b controlled by the diaphragm, suppose it to be controlled by any external means, thereby contracting or enlarging the passageway between pipe e and pipe k; would, or would not this operation of the valve affect the pitch of the sound produced by the column of air or steam? passing through pipe e and pipe k?

A. I should suppose it would vary the pitch assuming the column of air to be instrumental in emitting sound in substantial accordance with the variation in the size or volume of the current of air.

I do not feel sure that air and steam would be subject to the same change in the same way. I presume there would be a characteristic difference.

XQ 97. You understand the valve b to be practically rigid in itself, and not in any sense a flexible diaphragm?

A. I should understand it to be either sufficiently flexible or supported and controlled in such a manner as to avoid operation as a reed. This would probably result from the damping operation of the elements in contact with it upon opposite sides.

XQ 98. This ~~xxxx~~ ^{valve} b could not by its own "buckling" affect the column of air in a manner similar to the diaphragm of a phonograph or graphophone, could it?

A. I do not see how it could, but if I am in error in that respect, suitable mechanical skill would be able to avoid the difficulty and would naturally do so.

XQ 99. Have you ever seen an instrument similar to those shown or described in this patent?

A. I have not.

XQ 100. Referring to the French patent to Cres, No. 124,213, do you understand that the operation of the recording tool therein described is a cutting operation that removes the material in chips and shavings?

A. Where the record is made in material susceptible of being cut with ^a suitable recording point, the material is removed in chips and shavings. The Cres patent describes a record made in a tablet ~~xx~~ composed of a suitable backing or plate with a layer of carbon, or as an alternative construction, tallow or paraffine.

It also describes a heated wire, near the melting point, and a recording point which imprints the more or less intense vibration on the wire, and it states that "if the work of the cutting point on the heated metal is too great" the first described form of record may be used in any given case. I understand that the operation of the recording tool described is a cutting operation that removes the material, as stated in the question.

XQ 101. In describing his apparatus and method for making duplicates, is the master record, the tracing on lampblack, ~~xxx~~ a laterally sinuous, or a vertically undulating record?

A. Where the tracing on lampblack is referred to, and employed, the tracing would be laterally sinuous, but you must remember that the alternative method, in which paraffine or tallow is substituted for the carbon or lampblack is vertically sinuous, or vertically undulating. The two forms are described as alternative.

XQ 102. Where the patent states that the lampblack can be replaced by tallow, paraffine, &c., insulating an underlying metallic plate from the engraving action of an acid, do you understand that the record groove is laterally sinuous, or is ~~x~~ vertically undulating?

A. I think that what you refer to as laterally sinuous would describe a record designed to be etched by an acid, and this is the case with the patent inquired about.

XQ 103. Are you still of the opinion that when paraffine or tallow is substituted, according to the de-

scription in the patent, for the carbon or lampblack, the record groove would be vertically undulating?

A. I say it could be vertically undulating, and that in the specification Cres describes Edison's improvements and intimates they are his own, and free for use. As ~~xxxxxx~~ you well know, Edison's records were described both vertical and lateral.

XQ 104. In describing his apparatus for ~~xxxxxxxx~~ registering the vertically undulating records on the metallic wire Cres states that the portion of the wire to be operated on is heated and passed over an agate in which is a guiding groove, and that a small hole is dug in this guiding groove opposite to the stylus connecting with the vibrating drum. What is the function of this hole?

A. I suppose what you refer to is contained in the following portion of the patent:

"A suitably long portion of the part of the wire running between the spool and the traction roller, is pressed at its two ends by two roller conductors, rotating freely, of copper connecting with the poles of a strong battery. This portion becomes heated, reddened, can even thus be heated to white heat. It slides on an agate, or another stone refractory to the heat developed. The stone has a guiding groove in which is dug a small hole. Opposite to this small hole is the stylus solidly connected with the vibrating drum. This stylus is a sharp splinter of quartz, or of another stone, a splinter mounted on springs and bearing by the intermediary of a bearing against the vibrating drum.

.....

"The talking, singing, &c., is done against the drum, and the point, which is solidly connected therewith, imprints the more or less intense vibrations on this wire which can be softened, by the action of the current, until close to the melting point. /..... If the work of the cutting point on the heated metal is too great to give the required details and fineness, the indirect registering will be employed."

I understand that hole is either for ventilation or to assist in cooling the wire at or about the time it passes the recording point.

¹⁰⁵
XQ ~~44~~. What do you suppose is the object in cooling the wire immediately at the time when the registering tool is acting upon it, would this not to some extent interfere with the action of registering?

A. I presume in the ~~XXXX~~ practical construction of the apparatus such structure has been found to improve the result, and it would not interfere with the action of the registering, as you call it.

XQ ¹⁰⁶. What significance do you attach to this language which follows immediately after, and is apparently the description of the operation of Cros's duplicating apparatus:

"The lever doing its work, every undulation of the engraved line is reproduced in a corresponding flattening and bending in the steel wire. . . "

A. I understand the same thing that I have described, except that the translator may not have chosen the most apt language to express the fact. I should think that the operation described was substantially the same as that immediately preceding it, in which the imprinting and the operation of the cutting point on the wire is referred to.

^{107.}
XQ Please state whether or not subjecting metal to a high degree of heat renders it more malleable and pliable?

A. That would be so during the time that the heat was sufficiently great to soften the metal.

XQ 108. When it is desired to cut or scratch the surface of a thin sheet or other fragile body, is it not usual to place the same upon a smooth or even and unyielding support?

A. I think in some cases that would be so.

XQ 109. If it were desired to bend or emboss or give a curvature to the portion of ^a ~~the~~ strip or wire, would not this result be well accomplished by placing the body to be operated upon over a small hole or depression and striking the blow or applying the force immediately above this hole?

A. It would be unnecessary and unusual if the strip or wire in question were softened by heat. If, however, it were desired to prevent the bending or curvature, but to cut or engrave the surface, it would be very natural to cool the wire as soon as possible after the actual engraving.

XQ 110. If it were desired to prevent the bending or curvature, but to cut or engrave the surface, would it be natural to place a hole immediately under the registering tool?

A. Where the wire in question is moving, the cooling could not be effective at the very instant of engraving, and I should think it would be natural to arrange apparatus substantially as you describe.

XQ.111. Does this patent describe any apparatus for cooling the wire, and if so, at what period does it operate?

A. The patent states that "directly behind is arranged a grooved wheel carrying a liquid which cools off the wire and definitely solidifies the impression."

I think this should be directly before, instead of directly behind, considering the direction of movement of the wire, or it may be that the temperature is regulated as described, at or about the time the record is cut, and that the hole in the agate is an element in the means for introducing the cooling liquid to the wire, or it may be that the grooved wheel is an additional means of preventing the bending of the wire that might occur from softening by heat.

XQ 112. If a wire softened by heat be placed over a small hole and a blow or pressure be applied to the wire immediately above the hole, would the effect be to force a portion of the wire down into this hole?

A. It might be unless air passing through the hole should cool the wire sufficiently to prevent this.

XQ 113. Have you ever seen or examined a duplicating apparatus constructed in accordance with the specification and drawings of U.S. patent to Reynolds, No. 287,166?

A. I understand that all duplicating machines for phonographic use are in substantial accordance with the Reynolds apparatus, except that in place of using a rotary cutter a stationary cutter is employed. I have not seen the machine employing a rotary cutter, and in that limited sense I have not examined a duplicating apparatus like that inquired about.

XQ 114. Have you any knowledge regarding the so called duplicating apparatus of Reynolds, except that acquired from the patent No. 287,166?

A. The duplicating apparatus of Reynolds is substantially like the duplicating apparatuses in general use, and I have quite an extensive knowledge regarding the form in use, but I have not employed the particular rotating cutter arrangement which is employed in the Reynolds apparatus, and therefore have not the knowledge of it that you inquire about.

XQ 115. Is or is not this cutter wheel an important feature of the Reynolds phonograph upon which the patentee lays great stress, attributing to it a great advantage over the "old forms of phonographs", meaning thereby the Edison tinfoil phonograph?

A. The use of a rotating cutter is a characteristic of the Reynolds improvement and is an element in his claims, or some of them. The duplicating arrangement is an application of the well known duplicating machine to the use of a rotating cutter to form the duplicate. The Reynolds patent does not claim the duplicating apparatus and I do not understand that it is an important feature of his invention under the circumstances.

XQ 116. Of what material is the strip H¹ shown in Fig. 8 of the Reynolds patent, and referred to in lines 27 to 63 of page 3?

A. The specification states that:"

"The letter H¹ indicates a record strip, which may be drawn under the wheel B¹."

At another point in the specification it is stated that: "These strips may be made of any of the metals hereinbefore mentioned, or any durable material which will withstand the frictional wear and handling incident to their use. It will sometimes be found of advantage to make the record strip of soft steel and temper or harden it after the record has been cut. Such a strip will obviously be extremely durable."

I understand that the strip H^4 may be of any durable material.

XQ 117 How is this strip H^4 supported upon the wheel G^3 ?

A. The specification states:

"The letter G^3 indicates a supporting table against which the roller B^4 will be pressed by a spring s^4 . This table has an opening at g^3 through which plays the edge of a cutter wheel i^4 . . ."

What you call a wheel is therefore a table with a hole opposite the point where the recording style and the record meet. I understand the strip H^4 is supported on a table by gravity and is drawn across the arc shaped surface from one reel or roller to another.

XQ 118. If the strip H^4 rests upon the table G^3 , and the roller B^4 is pressed down upon the strip by the spring thus holding the strip down in addition to the force of gravity, what causes the strip to be somewhat raised above the table G^3 , as indicated in Fig. 3 of this Reynolds patent?

A. I suppose it is the edge of the rotating cutting tool which makes continuous contact with the edge of the strip, as appears from the drawing.

XQ 119 Is it your opinion, then, that the cutter wheel with its sharpened edge would raise strip H^4 against.

gravity and the pressure of the spring g^2 ?

A. It would tend to maintain it in substantially the same relations that are shown in Fig. 8, the edge of the wheel I^4 projects slightly above the edge of the table, and the drawing shows a space between the table and the strip. With the construction shown the result inquired about would undoubtedly be encountered.

Recess until 2 P.M.

X₁ 120. Does the cutter act upon the face of the strip to remove a portion of the same when there is no record upon the cylinder V^2 ? That is, when B^3 , the lever, is not vibrated?

A. I understand the record strip H^4 has its edge continuously in contact with the cutter, and that a line varying in depth and breadth is carved out of the edge of the strip in substantially harmony with the record on the which the tracer xx opposite end of the recording lever ~~xxxxxxx~~ follows. It appears that the cutter acts upon the face of the strip to remove a portion of the same continuously.

X₁ 121. When a strip of substantial material, as the metal strip A^4 , is drawn across ~~the~~ at right angles to the edge of the rotary cutter I^4 and its surface is acted upon or removed by said cutter, is, or is not considerable friction produced?

A. There is very little friction indeed. The speed of rotation of the cutter and its sharp edge practically avoid friction.

XQ 122. Then when a flat surface is drawn at right angles across the cutter-wheel, as 1^1 , the greater the rapidity of rotation of the cutter wheel, the more easily the strip can be drawn across, and the less the friction?

A. Assuming that the cutter is sharp, the speed of rotation is an important element in promoting the cutting action, and the fact is as you state it.

XQ 123. Does, or does not the action of spring g^2 increase the difficulty of cutting under the circumstances you have discussed?

A. It depends upon its adjustment. If we assume a proper adjustment it would decrease the probability of friction.

XQ 124. By proper adjustment, do you mean adjusted to press the roller against the strip and the supporting table, as indicated in line 44 of page 5 of the patent?

A. I should understand that an adjustment of the spring g^2 would be proper when the gravity of the bar B^3 and its position was such as shown in Fig. 6, and such as to just permit of bringing the strip and cutter into tight engagement.

XQ 125. Would you consider that pressing the roller against the strip?

A. It would be pressing it in that direction, subject to the control of the master record.

XQ 126. What is the character of the master record on the cylinder A^2 , as described by the patent?

A. It is comparatively fragile as compared with the more durable character of the strip. Tinfoil or wax

I should understand to be included under that designation.

XQ 127. With regard to the elevation between two successive indentations on such master record, please state the results produced when such an elevation comes in contact with the stylus b^3 ?

A. There would be a tendency to move the reproducing stylus in one direction and the recording point in the opposite direction, producing thereby a corresponding variation in the sound record in the duplicate.

XQ 128 That is, the end b^3 is lowered and the roller B^4 is lifted?

A. That is the tendency and the extent is microscopic.

XQ 129. Roller B^4 is lifted against the action of the spring, is it not?

A. That would be the direction of movement.

XQ 130. You have stated that the ~~xxxxxxx~~ proper adjustment of the parts would cause the roller B^4 to be in light engagement with the record strip, and when the roller B^4 is lifted so as to be out of engagement with the strip, what is the effect upon the cutting action of the wheel I^4 ?

A. I do not think the recording point B^4 gets entirely out of engagement with the strip, although its movement is upward, and in such a case the effect upon the cutting action of the wheel I^4 is to cause it to cut less deeply, producing a corresponding elevation in the record of the duplicate.

present is

XQ 131. I understood you to say that the spring ~~summarize~~

AT A STATED TERM of the United States Circuit Court for the District of New Jersey, in the Third Circuit, held at the United States Court Rooms in the City of Camden, on the 10 day of April, one thousand and eight hundred and ninety-nine;

PRESENT:

Judge.

AMERICAN GRAPHOPHONE COMPANY

vs.

UNITED STATES PHONOGRAPH COMPANY
AND GEORGE E. TEWKSBURY.

In Equity No. 5389

On patent No. 341,287.

386977

This cause having come on to be heard, it is

ORDERED, ADJUDGED AND DECREED as follows:

That Letters patent of the United States No. 341,287, granted May 4th, 1886, to Sumner Tainter, for improvements in recording and reproducing sounds, are good and valid Letters-patent; that the Complainant, the American Graphophone Company, was at the time of the filing of the bill of complaint herein, possessed of the full and entire right, title and interest in and to the same, and that the defendant, the United States Phonograph Company, has infringed upon said letters patent, and upon the exclusive rights of the Complainant under the same.

AND IT IS FURTHER ORDERED, ADJUDGED and DECREED that the Complainant recover of the defendant, the United States Phonograph Company, the profits which the latter has received

or which have accrued to it from said infringement by the manufacture and use of machines for making duplicate sound records as set forth in said patent, and in addition thereto the damages which the complainant has sustained thereby;

And it ~~is~~^{being} agreed by the parties that a reference to a Master be waived, and that the profits and damages to be recovered by the complainant of the defendant, the United States Phonograph Company, in said cause be assessed at the sum of one dollar, it is further

ORDERED, ADJUDGED and DECREED that the Complainant recover of the defendant, the United States Phonograph Company, the sum of one dollar, as damages and profits by reason of said infringement, that judgment be entered for said sum and execution issue thereon;

IT IS FURTHER ORDERED, ADJUDGED and DECREED that a perpetual injunction^{issue} against the defendant, the United States Phonograph Company, in accordance with the prayer of the bill.

Circuit Judge.

We hereby consent to the entry and filing of the above decree.

Complainants Solicitor.

Defendants Solicitor.